TOYOTOMI

Service Manual

MODEL:

GAN-A180GVR/GAG-A180GVR
GAN-A240GVR/GAG-A240GVR

(Refrigerant R-410A)

Content

Summary and Features

1. Safety Precautions 1

2. Specification 2

2.1 Unit Specification 2
2.2 Operation Characteristic Curve 4
2.3 Capacity Variation Ratio According to Temperature 4
2.4 Operation Data 5
2.5 Noise criteria curve tables for both models 5

3. Construction Views 6

3.1 Indoor Unit 6
3.2 Outdoor Unit 7

4. Refrigerant System Diagram 8

4.1 18K 8
4.2 24K 9

5. Schematic Diagram 10

5.1 Electrical Data 10
5.2 Electrical wiring 10
5.3 Printed Circuit Board 12

6. Function and Control 17

6.1 Remote Controller Description 17
6.2 Changing batteries and notices 20
6.3 Unit indication section 20
6.4 Unit ON/OFF button 20
6.5 Description of Each Control Operation 21

7. Installation Manual 26

7.1 Tools Required for Installation 26
(not supplied) 26
7.2 Installation Position Selection 26
7.3 Installation of Indoor Unit 26
7.4 Installation of Outdoor Unit 30
7.5 Test Operation 31

8. Exploded Views and Parts List 32

8.1 Exploded View 32
8.2 Parts List 36

9. Troubleshooting 40

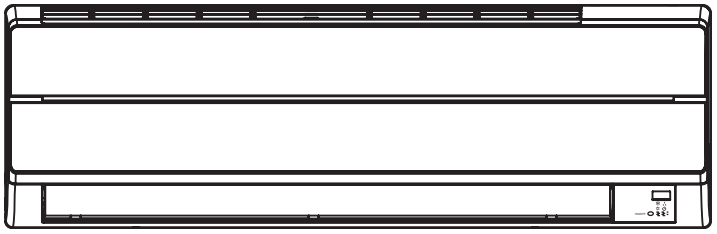
9.1 Precautions before Performing Inspection or Repair 40
9.2 Confirmation 41
9.3 Flashing LED of Indoor/Outdoor Unit and Primary Judgement 41
9.4 How to Check simply the main part 46
9.5 2-way, 3-way Valve Appearance 64

Summary and features

Indoor Unit

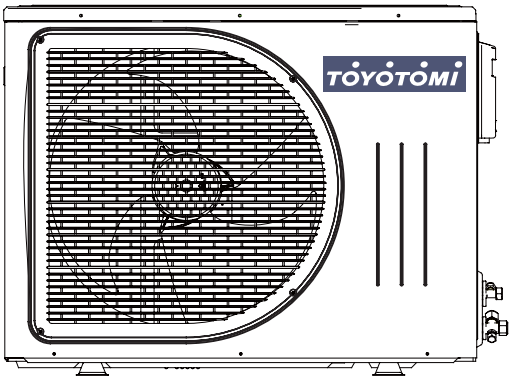
GAN-A180GVR
(cold plasma)

GAN-A240GVR
(cold plasma)



Outdoor Unit

GAG-A180GVR
GAG-A240GVR



Remote control window

YB1F2

2.Safety Precautions

Important!

Please Read Before Starting

This air conditioning system meets strict safety and operating standards. As for the installer or service person, it is an important part of your job to install or service the system and then the unit can operate safely and efficiently.

To prevent injury to the user or other people and property damage, the following instructions must be followed.

- Follow each installation or repair step exactly as shown.
- Observe all local, state, and national electrical codes.
- Pay close attention to all warning and caution notices given in this manual.

About the pictures:

Warning Erroneous handing gives a high possibility to induce serious results such as death or heavy injury.

Caution Erroneous handing may induce serious injury depending on the situation.

Warning

All electric work must be performed by licensed technician according to local regulations and the instructions given in this manual.

- **Do not supply power to the unit until all wiring and tubing are completed or reconnected and checked.**
- **Highly dangerous electrical voltages are used in this system. Carefully refer to the wiring diagram and these instructions when wiring. Improper connections and inadequate grounding can cause accidental injury or death.**
- **Ground the unit by following local electrical codes.**
- **Connect all wires tightly. Loose wires may cause overheating at connection points and a possible fire hazard.**

There is risk of fire, electric shock, explosion or injury.

Ask your dealer or specialized subcontractor for installation or repair work.

- **Make sure that the ceiling/wall is strong enough to hold the unit's weight. The outdoor unit should be installed in a location where air and noise emitted by the unit will not disturb the neighbors.**
- **Properly insulate any tubing run inside a room to prevent "sweating" that can cause dripping and the water may damage walls and floors.**
- **The outdoor unit must be installed on stable, level surface and the place where there is no accumulation of snow, leaves or rubbish.**
- **The unit should be installed according to the instructions in order to minimize the risk of damage from earthquake, typhoon or strong wind.**
- **When the refrigerant touches the fire etc., it was decomposed and poisonous gas is will be generated.**
- **Use only the specified refrigerant to charge the refrigerant circuit.**
- **Do not mix it with any other refrigerant and do not allow air to remain in the circuit.**
- **Air enclosed in the circuit can cause high pressure and result in a rupture and other hazards.**
- **After completing installation work, make sure that refrigerant gas has not leaked.**
- **The limit density can not be exceeded even if the refrigerant leaks by any chance.**
- **Turn the power off at the main power box (mains) before opening the unit to check or repair electrical parts and wiring.**
- **Keep your fingers and clothes away from any moving parts.**
- **Clean up the site after you've finished, remember to check that no metal scraps or bits of wiring have been left inside the unit being serviced.**
- **The unit must be properly earth connected.**

Caution

- **Never install the unit at the place where a combustible gas might leak.** The gas may ignite or explode when the gas leaks and collects in surround of the unit.
- **When the unit is installed at telecommunication centers or hospitals, take a proper provision against noise.**
- **When installing the unit at a watery place, provide an electric leak breaker.**
- **Do not wash the unit with water.**
- **Be very careful about unit transportation.** The unit should not be carried by only one person if it is more than 20kg. It may cause the damage of the unit and personnel injury.
- **Do not touch the heat exchanger fins with your hands, otherwise your hands may be hurt.**
- **Do not touch the compressor or refrigerant piping without wearing glove on your hands.** Touching directly such part can cause a burn or frostbite as it becomes high or low temperature according to the refrigerant state.
- **Do not operate the air conditioner without the air filter set place. Dust may accumulate and a failure may be incurred.**
- **At emergency status(if you smell something burning), stop the operation and turn off the power immediately.**

2. Specification

2.1 Unit Specification

Model			GAN/GAG-A180GVR	GAN/GAG-A240GVR
Product Code			CB14600360	CB14600370
Power Supply	Rated Voltage	V~	220-240	220-240
	Rated Frequency	Hz	50	50
	Phases		1	1
Power Supply Mode			Indoor	Indoor
Cooling Capacity (Min~Max)		W	5300(1050~6500)	6450(1400~7000)
Heating Capacity (Min~Max)		W	5800(1000~7100)	6700(1200~8000)
Cooling Power Input (Min~Max)		W	1600(360~2500)	2000(350~2600)
Heating Power Input (Min~Max)		W	1600(350~2600)	1850(350~2700)
Cooling Power Current		A	7.42	8.87
Heating Power Current		A	7.42	8.21
Rated Input		W	2600	2700
Rated Current		A	11.60	11.98
Air Flow Volume(SH/H/M/L/SL)		m^3/h	800/680/560/460	1000/800/700/550/-
Dehumidifying Volume		L/h	1.8	2
EER		W/W	3.31	3.22
COP		W/W	3.62	3.62
SEER		W/W	-	-
HSPF		W/W	-	-
Application Area		m^2	23-34	27-42
Indoor Unit	Model of indoor unit	G	GAN A180GVR	GAN A240GVR
	Fan Type		Cross-flow	Cross-flow
	Diameter Length(DXL)	mm	Φ98X650	Φ98X765
	Fan Motor Cooling Speed (SH/H/M/L/SL)	r/min	1350/1100/950/800/-	1350/1150/1000/850/-
	Fan Motor Heating Speed (SH/H/M/L/SL)	r/min	1400/1200/1050/900/-	1350/1150/1000/900/-
	Output of Fan Motor	W	20	35
	Fan Motor RLA	A	0.31	0.31
	Fan Motor Capacitor	μF	1.5	2.5
	Input of Heater	W	-	-
	Evaporator Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7	Φ7
	Row-fin Gap	mm	2-1.4	2-1.5
	Coil Length (LXDXW)	mm	657X25.4X304.8	765X342.9X25.4
	Swing Motor Model		MP28VB	MP35XX
	Output of Swing Motor	W	2.0	2.5
	Fuse	A	PCB 3.15A	PCB 3.15A
	Sound Pressure Level (SH/H/M/L/SL)	dB (A)	46/40/37/32/-	48/44/39/34/-
	Sound Power Level (SH/H/M/L/SL)	dB (A)	56/50/47/42/-	58/54/49/44/-
	Dimension (WXHXD)	mm	865X305X215	1008X319X221
	Dimension of Carton Box (L/W/H)	mm	945X380X295	1073X395X313
	Dimension of Package (L/W/H)	mm	948X383X310	1076X398X328
	Net Weight	kg	12	15
	Gross Weight	kg	16	20

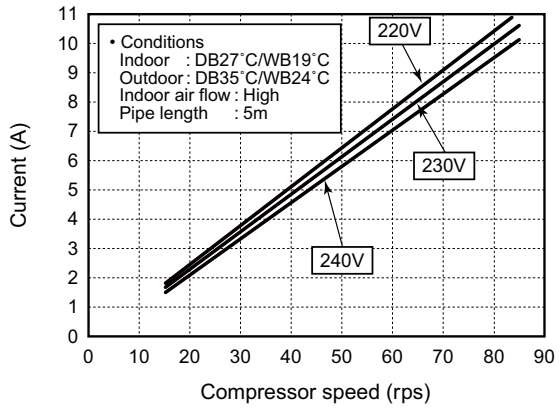
Outdoor Unit	Model of Outdoor Unit	A	GAG-A180GVR	GAG-A240GVR
	Compressor Manufacturer/Trademark		China Resources (Shenyang) Sanyo CO.,LTD/Sanyo	China Resources (Shenyang) Sanyo CO.,LTD
	Compressor Model		C-6RZ146H1A	C-6RZ146H1A
	Compressor Oil		FV50S	FV50S
	Compressor Type		Rotary	Rotary
	L.R.A.	A	41	41
	Compressor RLA	A	8.40	8.4
	Compressor Power Input	W	1640	1640
	Overload Protector		1NT11L-3979	1NT11L-3979
	Throttling Method		Capillary	Electron eXpansion valve
	Operation temp	℃	16~30	16~30
	Ambient temp (cooling)	℃	10~48	10~48
	Ambient temp (heating)	℃	-15~24	-15~24
	Condenser Form		Aluminum Fin-copper Tube	Aluminum Fin-copper Tube
	Pipe Diameter	mm	Φ7	Φ9.52
	Rows-fin Gap	mm	2-1.4	2-1.4
	Coil Length (LXDXW)	mm	853X660X38.1	847X660X44
	Fan Motor Speed	rpm	690	690
	Output of Fan Motor	W	60	60
	Fan Motor RLA	A	0.58	0.58
	Fan Motor Capacitor	μF	3.5	3.5
	Air Flow Volume of Outdoor Unit	m^3/h	3200	3200
	Fan Type		Axial-flow	Axial-flow
	Fan Diameter	mm	Φ520	Φ520
	Defrosting Method		Auto defrost	Auto defrost
	Climate Type		T1	T1
	Isolation		I	I
	Moisture Protection		IP24	IP24
	Permissible Excessive Operating Pressure for the Discharge Side	MPa	3.8	3.8
	Permissible Excessive Operating Pressure for the Suction Side	MPa	1.2	1.2
	Sound Pressure Level (H/M/L)	dB (A)	56/-/-	56/-/-
	Sound Power Level (H/M/L)	dB (A)	66/-/-	66/-/-
	Dimension (WXHXD)	mm	955X700X396	955X700X396
	Dimension of Carton Box (L/W/H)	mm	1026X455X735	1026X455X735
	Dimension of Package (L/W/H)	mm	1029X458X750	1029X458X750
	Net Weight	kg	52	55
	Gross Weight	kg	57	60
	Refrigerant		R410A	R410A
	Refrigerant Charge	kg	1.16	1.7
Connection Pipe	Length	m	5	5
	Gas Additional Charge	g/m	20	20
	Outer Diameter Liquid Pipe	mm	Φ6	Φ6
	Outer Diameter Gas Pipe	mm	Φ12	Φ12
	Max Distance Height	m	10	10
	Max Distance Length	m	25	25

The above data is subject to change without notice. Please refer to the nameplate of the unit.

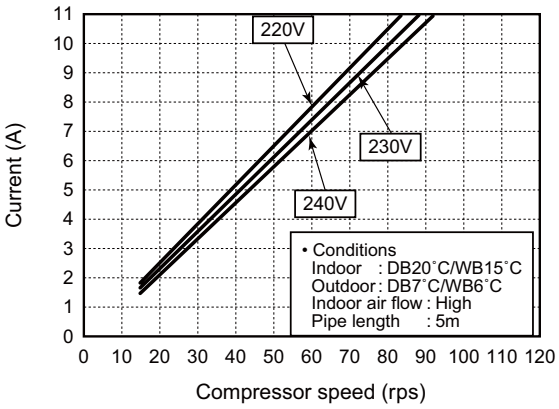
2.2 Operation Characteristic Curve

18K

<Cooling>

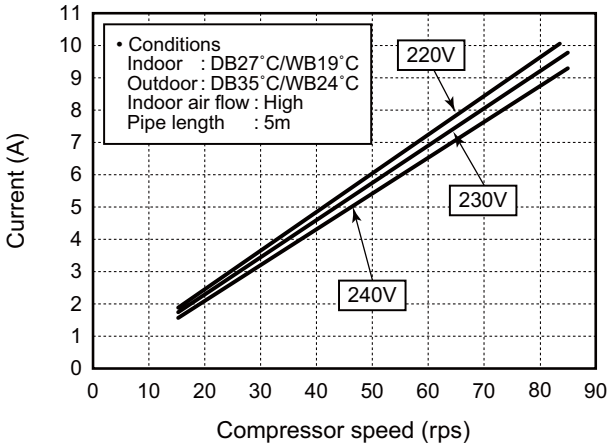


<Heating>

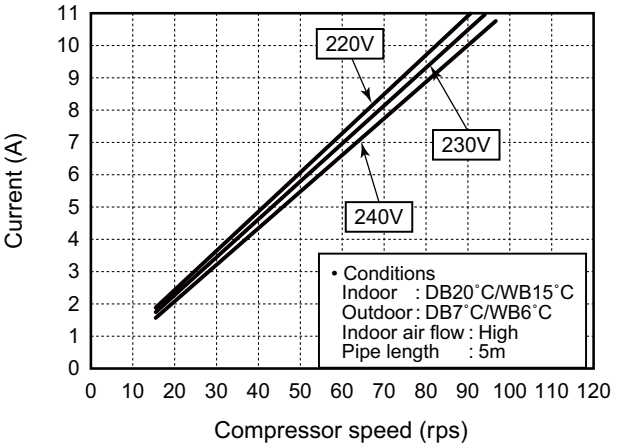


24K

<Cooling>

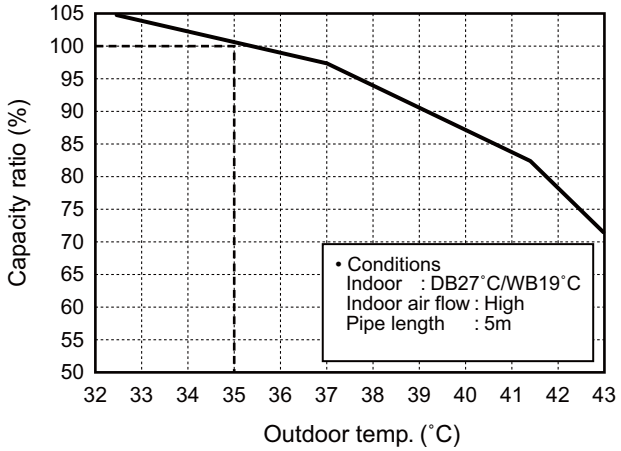


<Heating>

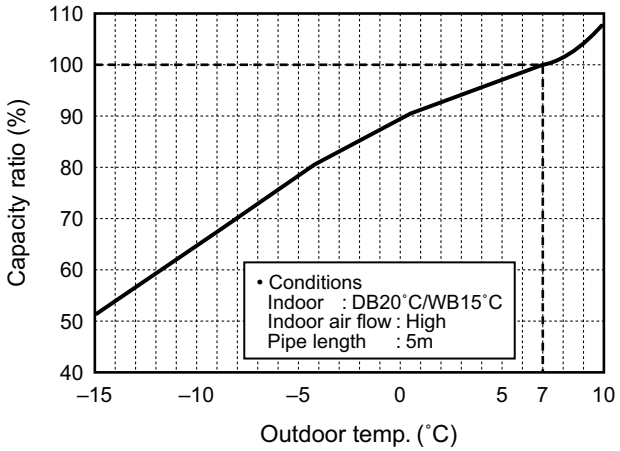


2.3 Capacity Variation Ratio According to Temperature

<Cooling>



<Heating>



2.4 Operation Data

Cooling

Temperature condition (°C)		Model name	Standard pressure	Heat exchanger pipe temp.		Indoor fan mode	Outdoor fan mode	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			
27/19	35/-	**18K**	0.9 to 1.1	12 to 14	70 to 40	Super High	High	72
		24K	0.8 to 1.0	10 to 12	72 to 40	Super High	High	83

Heating

Temperature condition (°C)		Model name	Standard pressure	Heat exchanger pipe temp.		Indoor fan mode	Outdoor fan mode	Compressor revolution (rps)
Indoor	Outdoor		P (MPa)	T1 (°C)	T2 (°C)			
20/–	7/6	**18K**	2.2 to 2.4	70 to 35	2 to 4	Super High	High	66
		24K	2.5 to 2.7	70 to 35	0 to 3	Super High	High	75

NOTES :

(1) Measure surface temperature of heat exchanger pipe around center of heat exchanger path U bent. (Thermistor thermometer)

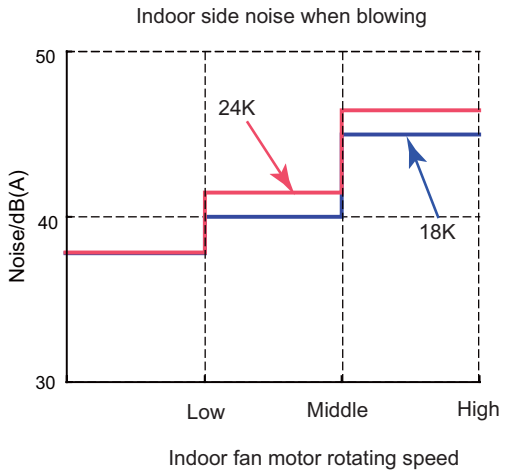
(2) Connecting piping condition : 5 m

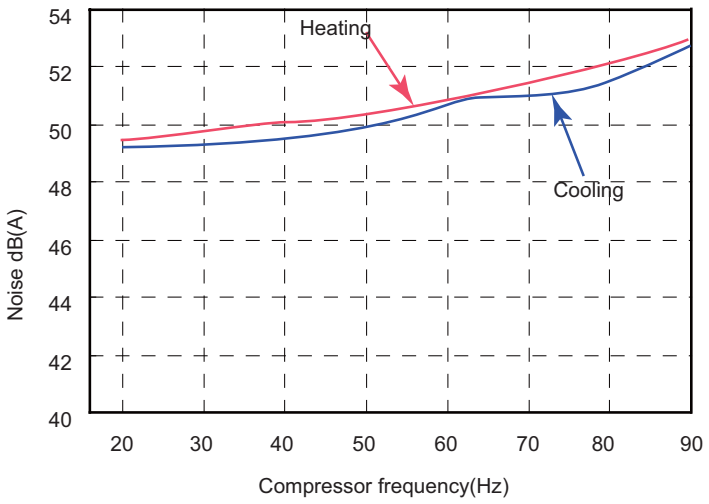
(3) P: pressure of air pipe connected to the indoor and outdoor units (gas valve side)

T1: Inlet and outlet temperature for evaporator

T2: Inlet and outlet temperature for condenser

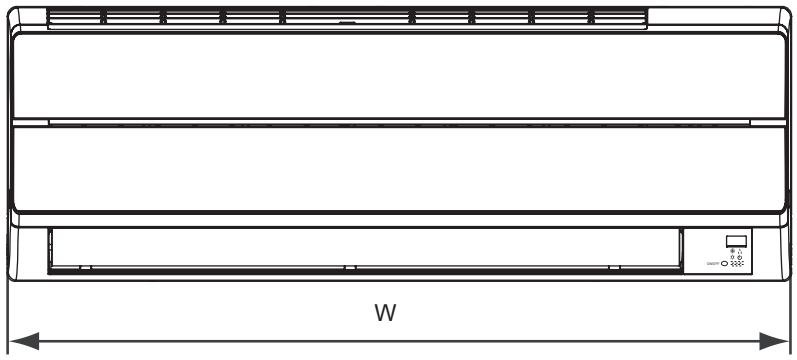
2.5 Noise criteria curve tables for both models

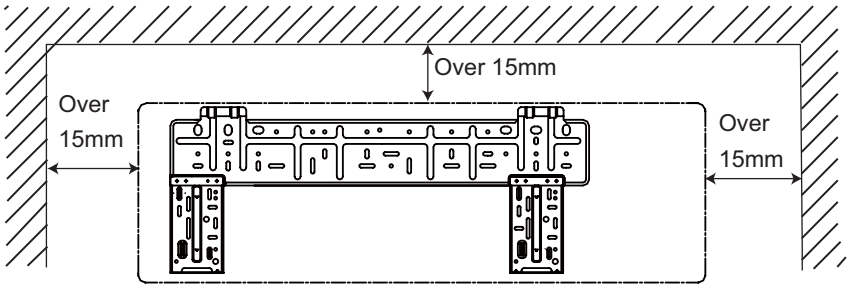




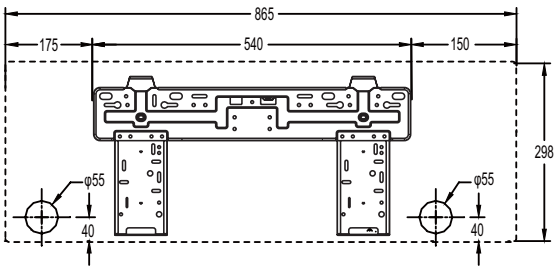
3. Construction Views

3.1 Indoor Unit

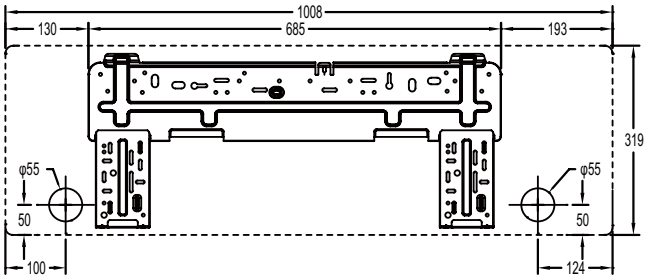




18K Wall Mounting Frame

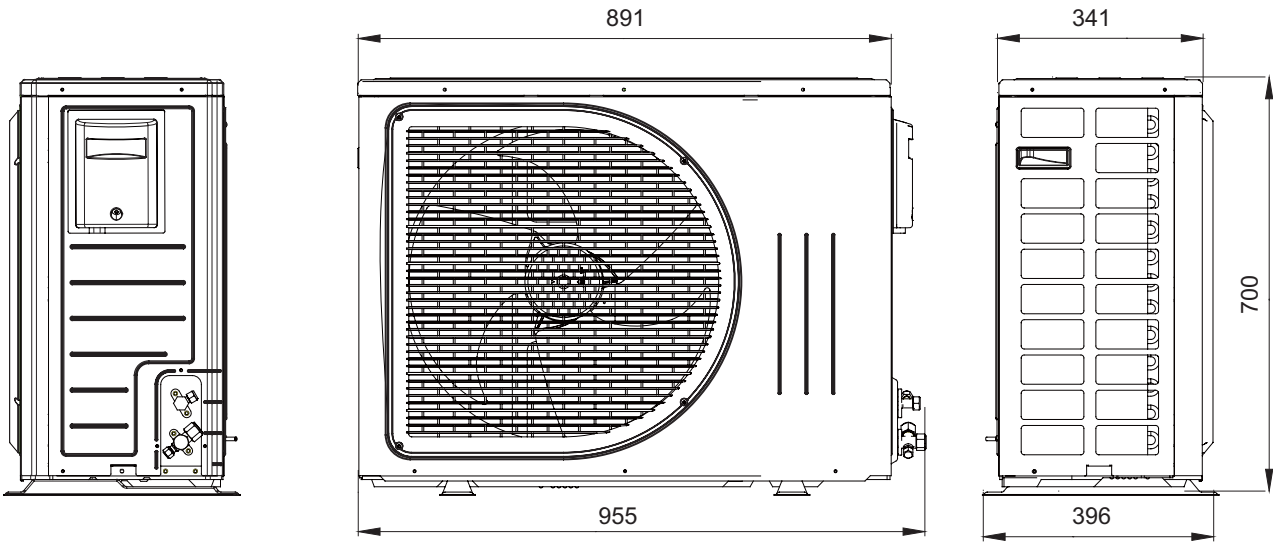


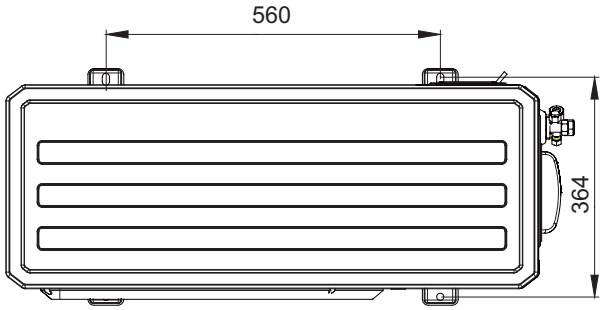
24K Wall Mounting Frame

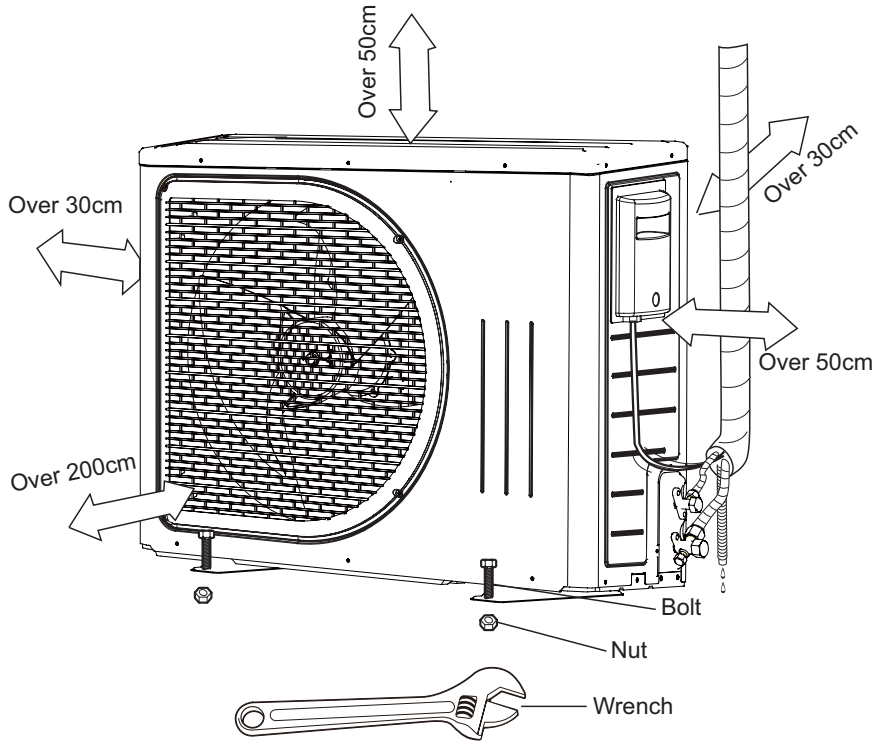


Model	W(mm)	H(mm)	D(mm)
18K	865	305	215
24K	1008	319	221

3.2 Outdoor Unit



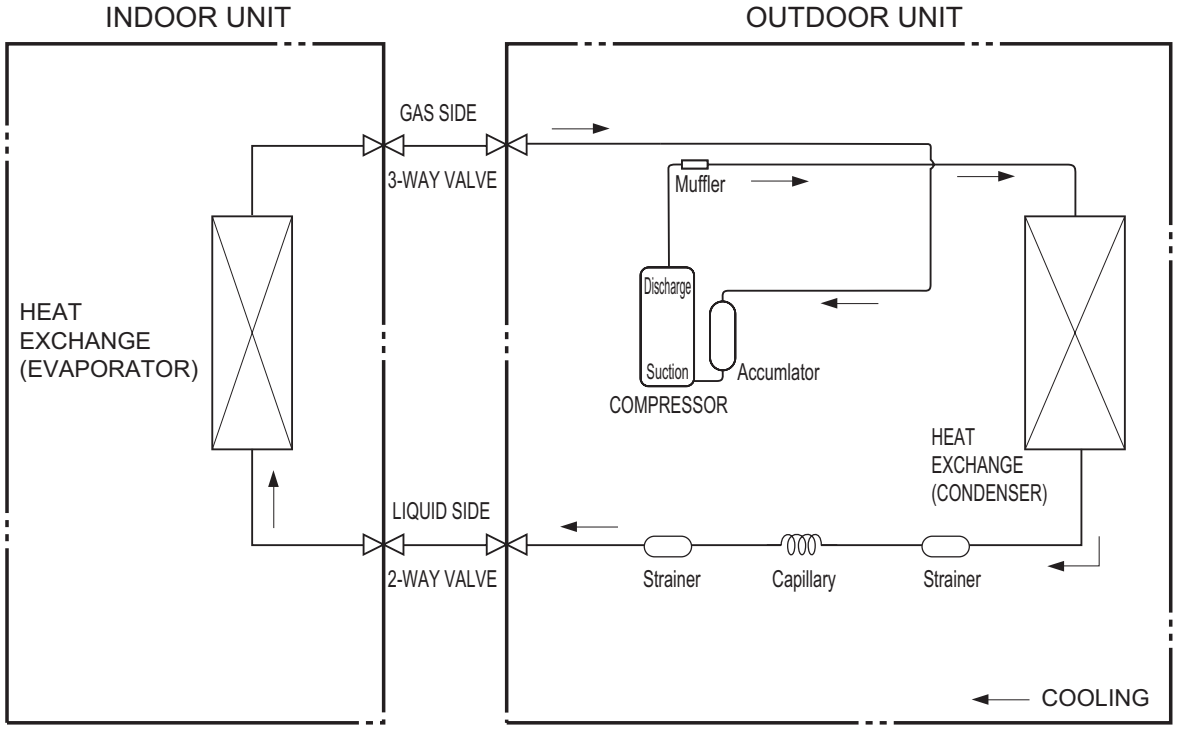




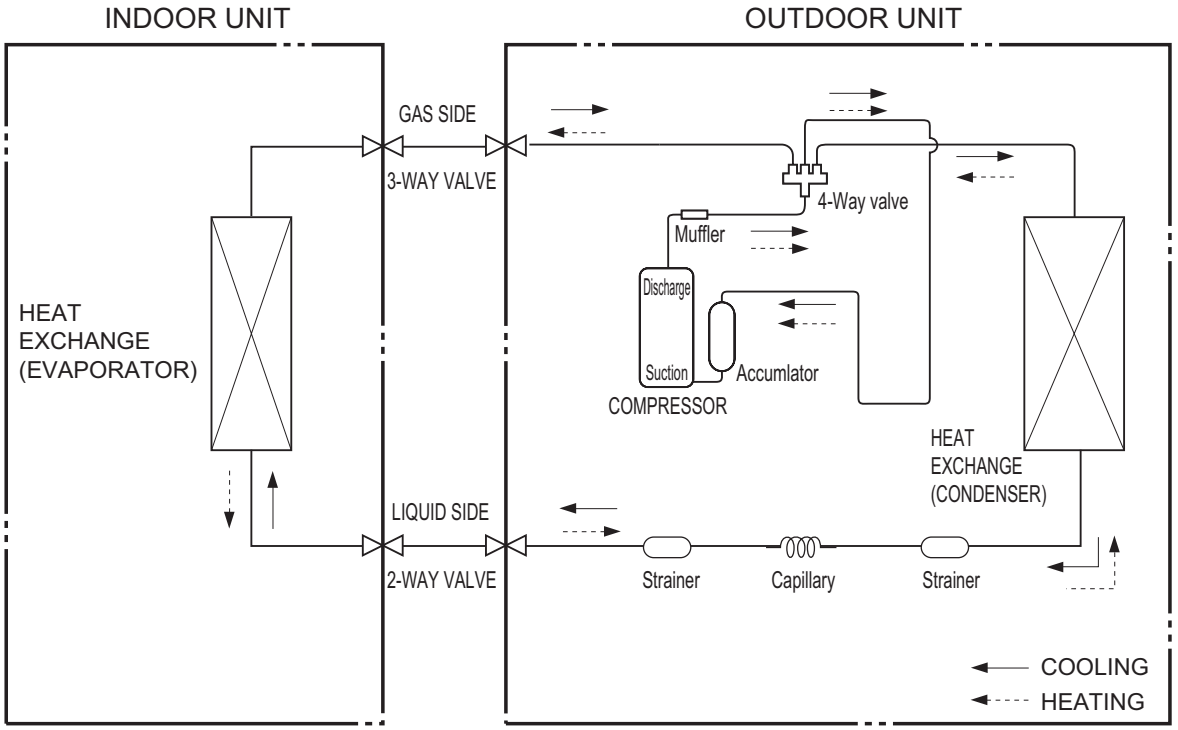
4. Refrigerant System Diagram

4.1 18K

(1)Cooling Only Models



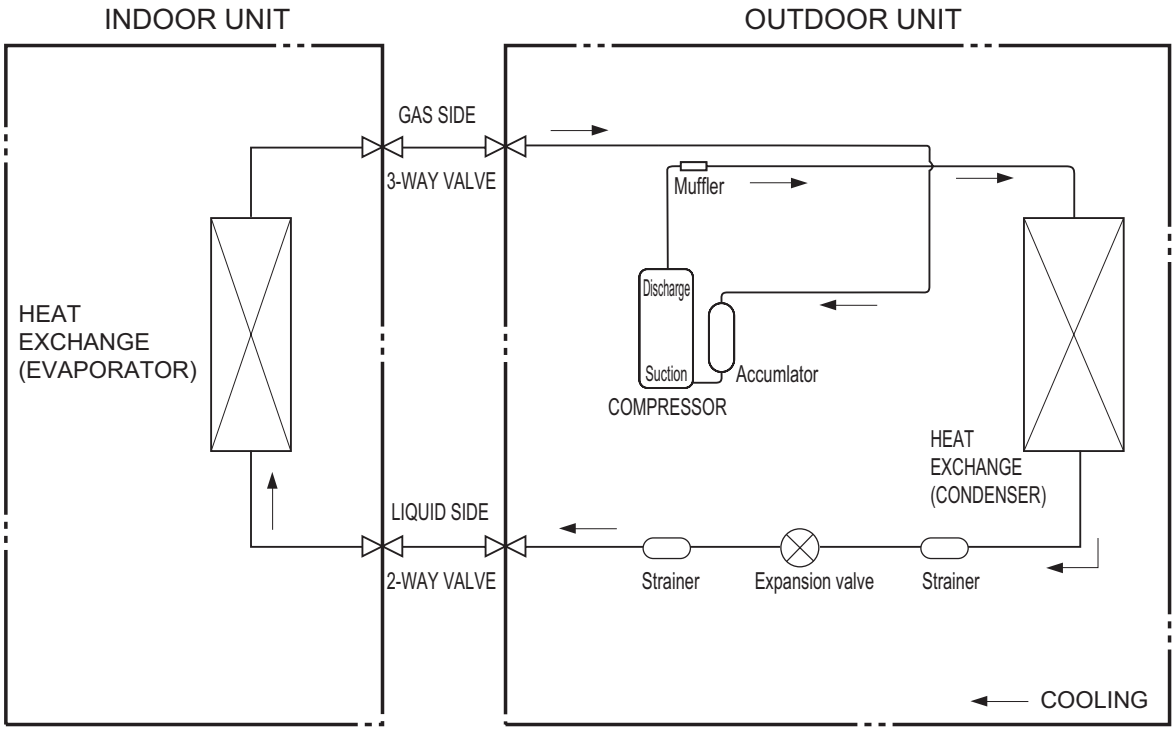
(2)Cooling & Heating Models



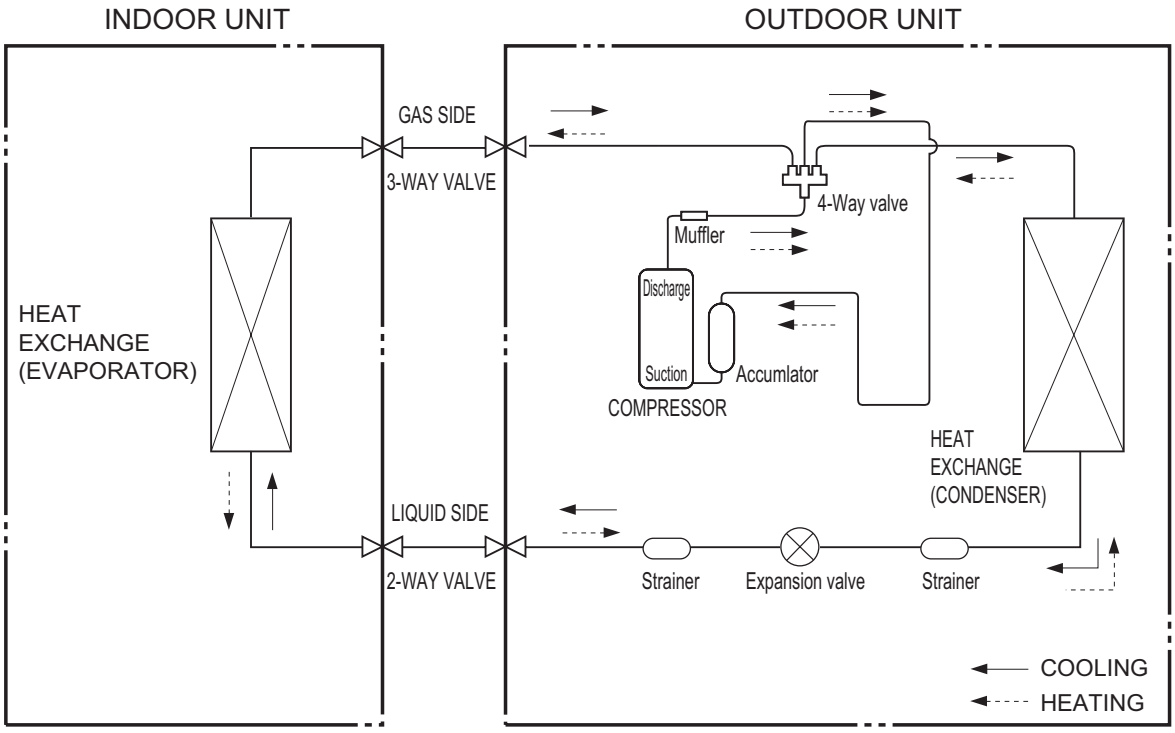
Refrigerant pipe diameter
Liquid : 1/4" (6 mm)
Gas : 1/2" (12 mm)

4.2 24K

(1)Cooling Only Models



(2)Cooling & Heating Models



Refrigerant pipe diameter
Liquid : 1/4" (6 mm)
Gas : 1/2" (12 mm)

5. Schematic Diagram

5.1 Electrical Data

Meaning of marks

● **Indoor Unit**

Symbol	Color symbol	Symbol	Color symbol
BU	BLUE	BN	BROWN
YE	YELLOW	BL	BLUE
RD	RED	BK	BLACK
YEGN	YELLOW GREEN	⏚	PROTECTIVE EARTH

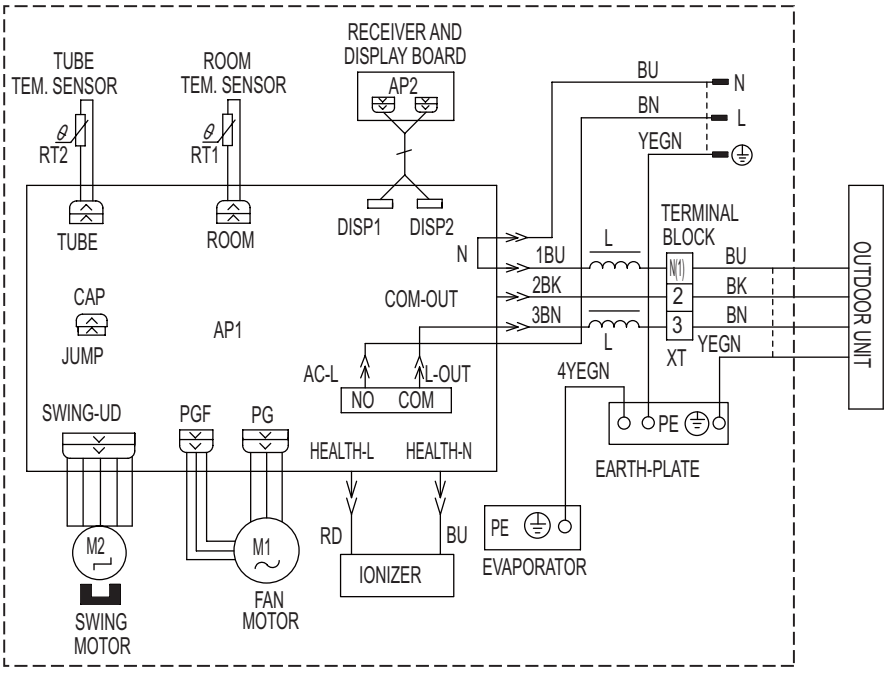
● **Outdoor Unit**

Symbol	Parts name	Symbol	Color symbol	Symbol	Color symbol
C1	CBB61	BN	BROWN	WH	WHITE
C2	CBB65	BU	BLUE	YE	YELLOW
SAT	OVERLOAD	BK	BLACK	RD	RED
COMP	COMPRESSOR	OG	ORANGE	YEGN	YELLOW GREEN
⏚	PROTECTIVE EARTH	WH	WHITE		

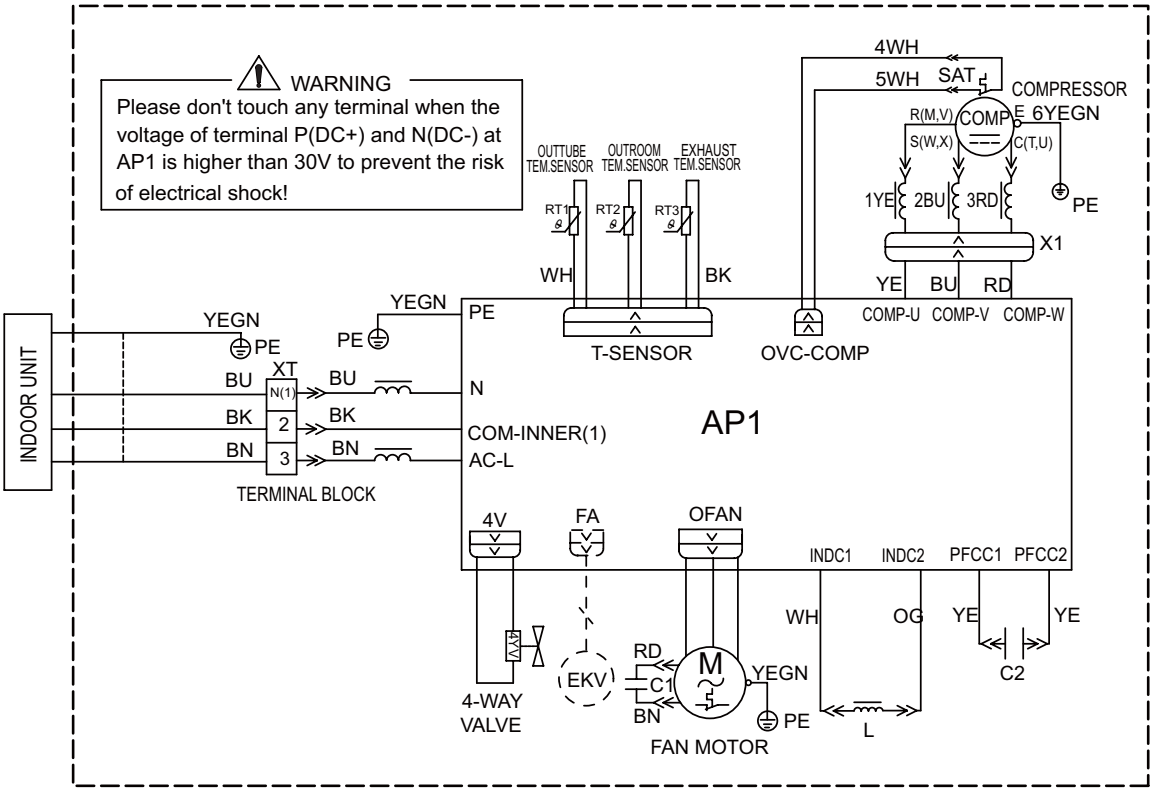
5.2 Electrical wiring

These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

● **Indoor Unit**



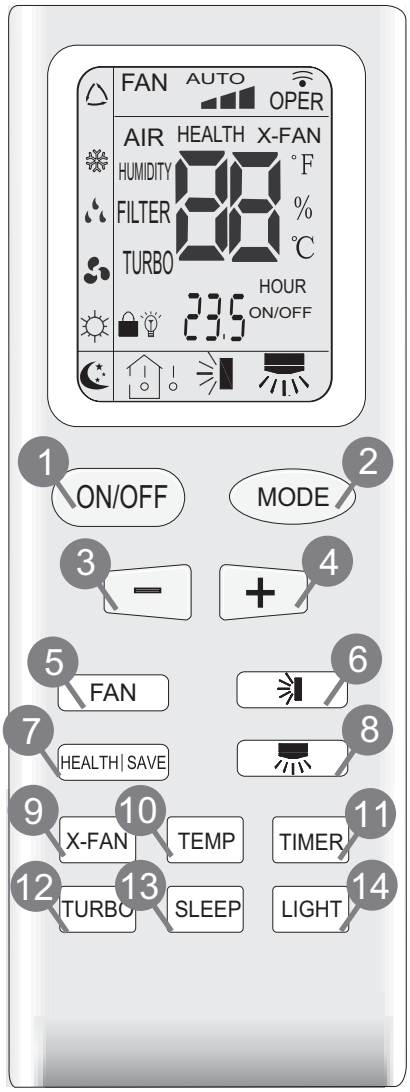
● **Outdoor Unit**



These circuit diagrams are subject to change without notice, please refer to the one supplied with the unit.

6. Function and Control

6.1 Remote Controller Description



1 ON/OFF

Press this button to start or stop operation.

2 MODE

Press it to select operation mode (AUTO/COOL/DRY/FAN/HEAT).

3 - :

Press it to decrease temperature setting.

4 + :

Press it to increase temperature setting.

5 FAN

Press it to set fan speed.

6

Press it to set up &down swing angle.

7 HEALTH SAVE

Press it to select health mode on or off.

8

Press it to set left & right swing angle.

9 X-FAN

10 TEMP

11 TIMER

Press it set auto-on timer/auto-off timer.

12 TURBO

13 SLEEP

14 LIGHT

※ **Note: X-FAN is the alternative expression of BLOW for the purpose of acceptance.**

1 ON/OFF ：

Press this button to turn on the unit. Press this button again to turn off the unit.

2 MODE ：

Each time you press this button, a mode is selected in a sequence that goes from AUTO, COOL, DRY, FAN,and HEAT *, as the following:

*Note:Only for models with heating function.

After energization, AUTO mode is defaulted. In AUTO mode, the set temperature will not be displayed on the LCD, and the unit will automatically select the suitable operation mode in accordance with the room temperature to make indoor room comfortable.

3 ＋ ：

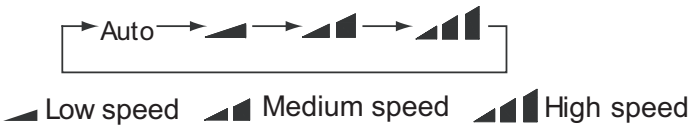
Press this button to decrease set temperature. Holding it down above 2 seconds rapidly decreases set temperature. In AUTO mode, set temperature is not adjustable.

4 —:

Press this button to increase set temperature. Holding it down above 2 seconds rapidly increases set temperature. In AUTO mode, set temperature is not adjustable.

5 FAN：

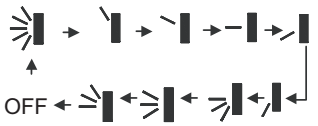
This button is used for setting fan speed in the sequence that goes from AUTO, , , to , then back to Auto.



6 :

- Press button to start or stop up & down swing function.The remote controller defaults to simple swing condition.
- Press + button and button at the same time at unit OFF to switch between simple swing and static swing, blinking 2 seconds.

In static swing condition, press button, the swing angle of up & down horizontal louver changes as below:



- If the unit is turned off during swing operation,the louver will stop at present position.

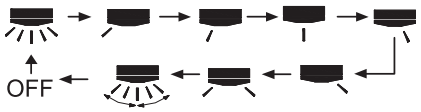
7 HEALTH|SAVE:

Press HEALTH part of this button to turn on or off HEALTH function.
Pressing SAVE part of this button, SE is displayed and the unit goes into SAVE operation mode. Press SAVE part of the button again to cancel SAVE function. During SAVE operation, the temperature and fan speed is not adjustable.

8 :

- Press button to start or stop left & right swing function.The remote controller defaults to simple swing condition.

- Press + button and button at the same time at unit OFF to switch between simple swing and static swing, blinking 2 seconds.
- In static swing condition, press button, the swing angle of left & right louver changes as below:



- If the unit is turned off during swing operation,the louver will stop at present position.

9 X-FAN:

Pressing X -FAN button in COOL or DRY mode, the icon "X-FAN" is displayed and the indoor fan will continue operation for 10 minutes in order to dry the indoor unit even though you have turned off the unit.
After energization, X-FAN OFF is defaulted. X-FAN is not available in AUTO,FAN or HEAT mode.

10 TEMP:

Press this button, could select displaying the indoor setting temperature or indoor ambient temperature.When the indoor unit firstly power on, it will display the setting temperature, if the temperature's displaying status is changed from other status to " ", displays the ambient temperature, 5s later or within 5s, it receives other remote control signal that will return to display the setting temperature. if the users haven't set up the temperature displaying status,that will display the setting temperature.

11 TIMER:

Press TIMER button at unit ON to set TIMER OFF, HOUR OFF blinking. Press TIMER button at unit OFF to set TIMER ON, HOUR ON blinking. In this case, pressing + or - button changes time setting.
Holding down either button rapidly changes time setting (time setting range 0.5-24hours). Press TIMER button again to confirm setting, HOUR ON/OFF stopping blink. If there is not any operation of button within 5 seconds during HOUR ON/OFF blinking, TIMER setting will be canceled.

12 TURBO:

Press this button to activate / deactivate the Turbo function which enables the unit to reach the preset temperature in the shortest time. In COOL mode, the unit will blow strong cooling air at super high fan speed.
In HEAT mode, the unit will blow strong heating air at super high fan speed. (This function is not applicable for some models).

13 SLEEP :

Press this button to go into the SLEEP operation mode. Press it again to cancel SLEEP operation. This function is available in COOL , HEAT (Only for models with heating function) or DRY mode to maintain the most comfortable temperature

14 LIGHT:

Press LIGHT button to turn on the display's light and press this button again to turn off the display's light. If the light is tunrned on , is displayed. If the light is tunrned off, disappears.

4 and 3 About lock:

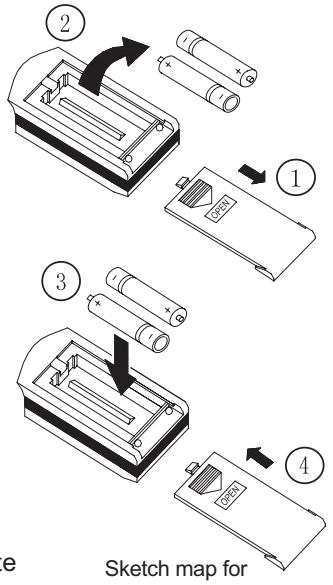
Press "+ " and "-" buttons simultaneously to lock or unlock the keypad. If the remote controller is locked, is displayed. In this case, pressing any button, blinks three times.

3 and 2 About switch between fahrenheit and cenrigrade

At unit OFF, press "MODE" and "- " buttons simultaneously to switch between ℃ and ℉.

6.2 Changing Batteries and Notices

1. Remove the battery cover plate from the rear of the remote controller. (As shown in the figure)
2. Take out the old batteries.
3. Insert two new AAA1.5V dry batteries and pay attention to the polarity.
4. Reinstall the battery cover plate.



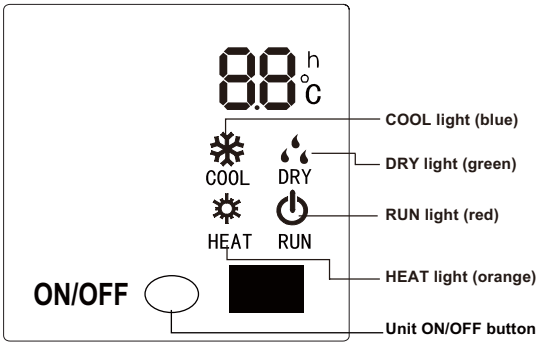
Sketch map for changing batteries

★ NOTE:

- When replacing the batteries, do not use old or different batteries, otherwise, it may cause malfunction.
- If the wireless remote controller will not be used for a long time, please remove batteries to prevent damage from leaking batteries.
- The operation should be performed in its receiving range.
- It should be kept 1m away from the TV set or stereo sound sets.
- If the wireless remote controller does not operate normally, please take the batteries out and replace them after 30 seconds. If it still can't operate properly, replace the batteries.

6.3 Unit indication Section

1. When the unit is energized, all the display marks will be shown and only the power LED lights.
2. When the unit is turned on remotely, the power LED goes out while the current setting running mode is displayed.
3. During defrosting, “H1” is displayed in “dual 8”.
4. In normal situation, the setting temperature is displayed in “dual 8” place.
5. When the signal of displaying indoor temperature or outdoor temperature is received from the controller, the corresponding temperature will be shown in “dual 8” place. It resumes displaying setting temperature 5s later.



6.4 Unit ON/OFF Button

If the remote controller is lost or broken, please use the manual switch button. At this time, the unit will run at the Auto mode, but the temperature and fan speed cannot be changed. The operation was shown as below:

To open the panel, the manual switch is on the displayer box.

- Turn on the unit: After unit is turned off, press the button,the unit will run at Auto mode immediately. The microcomputer will accord to the indoor temperature to select (Cooling, Heating, Fan) and obtain the comfortable effect.
- Turn off the unit: After unit is turned on, press the button, the unit will stop working.

Operation of automatic buttons:

	less than 5s	keep 5 ~ 10 s	keep more than 10s
operation during stop	start running	start compulsory running	stop compulsory running (avoid button lock)
operation during running	stop running	stop running	
operation during stop （communication error）	(after running, abnormal)		

6.5 Description of Each Control Operation

Indoor Unit

Temperature Parameter

- Room setting temperature (Tpreset)
- Room ambient temperature (Tamb.) (temperature sensor :15K, partial pressure resistance:15K)
- Surface temperature of copper pipe for indoor heat exchanger ($T_{indoor\ tube)}$ (temperature sensor: 20K, partial pressure resistance: 20K)

1. Basic Functions of System

(1) Cooling Mode

1. In this mode, indoor fan and swing will operate according to the setting status. The temperature setting range is 16~30℃.(Fahrenheit: 61~86℉).
2. When the unit stop operation due to malfunction of outdoor unit or protection, indoor unit will keep original operating status. Malfunction code will be displayed.
3. When 0≤(Tpreset-Tamb.), if the indoor unit is operating at high fan speed, the speed of fan will change to medium fan speed; if the indoor unit is operating at medium or low fan speed, the speed of fan will keep the same; (This condition can only be carried out after the compressor is started up); There's no change for super-high fan speed; when (Tamb.-Tpreset)≥1℃, the fan speed will resume setting fan speed;

(2) Dry Mode

1. In this mode, fan will operate at low fan speed and swing will operate at setting status. The temperature setting range is 16~30℃.(Fahrenheit: 61~86℉).
2. When the unit stop operation due to malfunction of outdoor unit or protection, indoor unit will keep original operating status. Malfunction code will be displayed.

(3) Fan Mode

1. In this mode, indoor fan will operate at high, medium, low or auto fan speed. Compressor, indoor fan and the four-way valve will all stop operation.
2. In this mode, the temperature setting range is 16~30℃.(Fahrenheit: 61~86℉).

(4) Heating Mode

1. In this mode, the temperature setting range is 16~30℃. (Fahrenheit: 61~86℉).
2. Working condition and process of heating: when the unit is turned on in heating mode, indoor unit enters into anti-cold air condition; when the unit is tuned off, the unit will enter into the condition of blowing residual heat.
3. Protection function: in heating mode, when the compressor is stopped due to malfunction, indoor fan will operate at the condition of blowing residual heat.
4. Defrosting control: after receiving the defrosting signal from outdoor unit, the defrosting code H1 will be displayed.
5. Anti-cold function
6. Blowing residual heat function;

a. During heating operation, when the stopping condition for the compressor is reached, the compressor and the outdoor fan motor stop operation. The upper& down horizontal louver will rotate to the horizontal position L. The indoor fan will be stopped after operating for 60s at setting speed.

b. Due to the blockage of PG motor, horizontal louver will keep the stop position when the unit is turned off. (In other modes) When the unit is stopped due to other malfunctions, up&down horizontal louver will rotate to horizontal position L. The indoor fan will be stopped after operating for 60s at setting speed.

c. If the unit is turned off when the compressor is operating in heating mode or auto heating mode, up&down horizontal louver will rotate to horizontal position L. The indoor fan will be stopped after operating for 60s at setting speed.

(5) Auto Mode

1. When Tamb.≥26℃, the unit will operate in cooling mode. The implied setting temperature is 25℃. ((Fahrenheit: 77℉).
2. Heat pump type: when Tamb≤22℃, the unit will operate in heating mode. The implied setting temperature is 20℃. ((Fahrenheit: 68℉).
3. Cooling only unit: when Tamb≤25℃, the unit will operate in auto mode. The implied setting temperature is 25℃. ((Fahrenheit: 77℉).
4. When 23℃≤Tindoor amb. ≤25℃, the unit will operate in auto fan mode if the unit is turned on and enters into the auto mode for the fist time. If the unit is switched to auto mode from other mode, it will keep the previous operation mode (if the unit is switched to auto mode from dry mode, the unit will operate at auto fan mode).

2. Display Status of Indoor Indicator

(1) Status of Indoor Display Board

1. After energization, all the icons will be displayed and then only the power indicator is bright. When the unit is turned on by remote controller, the operation indicator will be bright. Meanwhile, the current setting operation mode will be displayed.
2. During defrosting, "dual-8" will display "H".
3. "Dual-8" displays setting temperature.

➢ Display of Operation Icon and Mode Icon

After energization, all the icons will be displayed for once. In standby status, the operation indicator will be in red. If turn on the unit by remote controller, the operating indication icon will be bright. Meanwhile, the current setting operation mode will be displayed (mode indicator: cooling indicator, heating indicator, dry indicator). If turn off the light button, all displays will be turned off.

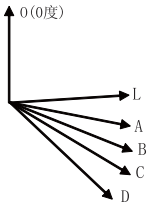
➢ Temperature display control mode for split type unit

1. When user set the remote controller as the setting temperature display status, the current setting temperature will be displayed on remote controller.
2. Only when the remote control signal is switched to indoor ambient temperature display status from other display status, controller will display the indoor ambient temperature for 5s and then turn back to display the setting temperature.
3. When user hasn't set the temperature displaying status, it will be displayed according to the setting temperature.

(2)Malfunction Display of Indoor Unit

When multiple malfunctions occurred simultaneously, malfunction protection codes will be displayed in cycle.

3.Other Control Target



(1) Up&down swing function: the mode for swing motor is MP28EA

After energization, up & down swing motor will firstly let the horizontal louver anticlockwise rotate to position 0 to close air outlet.

If swing function has not been set after startup of the unit, up & down horizontal louver will clockwise turn to position D in HEAT mode, or clockwise turn to level position L in other modes.

If setting swing function while starting up the unit, the horizontal louver will swing between L and D.

There are 7 kinds of swing status of horizontal louver: Positions L, A, B, C and D, swing between L and D and stop at any position between L and D.

Upon turning off the unit, the horizontal louver will close at position 0. Swing function is available only when swing function set and indoor fan is operating.

Note: If the position is set between L and B, A and C or B and D by remote controller, the horizontal louver will swing between L and D.

L----A----B----C----D

(2) Buzzer

Upon energization and operation, the buzzer will give out sound.

(3) Auto Button

After pressing this button, the unit will operate in auto mode. Indoor fan will operate at auto fan speed and swing motor will operate. Press this button again to turn off the unit. The complete unit is energized when pressing the button and the complete unit will enter into fast testing status. After energization, if it's detected that the auto button is pressed down and the complete unit is at fast testing status, the fast testing status will be exited.

(4) Sleep Function

This mode is only valid in cooling and heating mode. The unit will select the appropriate sleeping curve to operate according to the different setting temperature.

During cooling mode:

(1) When the initial temperature is set as 16~23℃, after starting up the sleep function, the temperature will increase by1℃ every one hour. After the temperature has increased by 3℃, the unit will keep this temperature. When the unit has operated for 7 hours, the temperature will decrease by 1℃ and then the unit will operate at this temperature all the time;

(2) When the initial temperature is set as 24~27℃, after starting up the sleep function, the temperature will increase by1℃ every one hour. After the temperature has increased by 2℃, the unit will keep this temperature. When the unit has operated for 7 hours, the temperature will decrease by 1℃ and then the unit will operate at this temperature all the time;

(3) When the initial temperature is set as 28~29℃, after starting up the sleep function, the temperature will increase by1℃ every one hour. After the temperature has increased by 1℃, the unit will keep this temperature. When the unit has operated for 7 hours, the temperature will decrease by 1℃ and then the unit will operate at this temperature all the time;

(4) When the initial temperature is set as 30℃, the unit will operate at this temperature. After the unit has operate for 7hours, the temperature will decrease by 1℃ and then the unit will operate at this temperature all the time.

During Heating Mode:

(1) When the initial temperature is set at 16℃, the unit will operate at this temperature all the time;

(2)When the initial temperature is set as 17~20℃, after starting up the sleep function, the temperature will decrease by1℃ every one hour. After the temperature is decreased by 1℃, the unit will operate at this temperature;

(3)When the initial temperature is set as 21~27℃, after starting up the sleep function, the temperature will decrease by1℃ every one hour. After the temperature is decreased by 2℃, the unit will operate at this temperature;

(3)When the initial temperature is set as 28~30℃, after starting up the sleep function, the temperature will decrease by1℃ every one hour. After the temperature is decreased by 3℃, the unit will operate at this temperature;

General timer and clock timer functions are compatible by equipping different functions of remote controller.

(5) Timer Function

General timer and clock timer functions are compatible by equipping different functions of remote controller.

General timer:

Timer ON

If timer ON is set during operation of the unit, the unit will continue to operate. If timer ON is set at unit OFF, upon ON time reaches the unit will start to operate according to previous setting status.

Timer OFF

If timer OFF is set at unit OFF, the system will keep standby status. If timer OFF is set at unit ON, upon OFF time reaches the unit will stop operation.

(6) Blow Function

Blow function can be set in cooling and dry mode.

(7) Indoor Fan Control

Indoor fan can be set at super-high, high, medium or low. Meanwhile, the fan will operate at super-high, high, medium and low fan speed respectively and it can also set at auto fan speed.

(8) Memory Function

Memory content includes mode, up & down swing, light, set temperature and set fan speed, general timer (clock timer can't be memorized), Upon power failure, the unit after power recovery will automatically start operation according to memorized content. The unit, without timer setting before power failure, will operate according to the last setting after power recovery. The unit, with general timer setting which has not been fulfilled

before power failure, will memorize the time setting and re-calculate the time after power recovery. If there is timer function in the last remote controller command but setting time has reached, the system will act as timer on/off setting before power failure. After power failure, the system memorizes the operation states before power failure without timer action. Clock timer can not be memorized.

(9) Locked protection to PG motor

If the indoor fan motor's rotational speed after startup keeps slow for a continuous period of time, the unit will stop operation and display "H6".

(10)Turbo Function

This function can be set in cooling or heating mode to quickly cool or heat the room（Turbo function is not available in auto, dry and fan mode）. After pressing the turbo button, indoor fan will operate at super-high fan speed.

5. Malfunction Detection for Temperature sensor

(1) Indoor ambient temperature sensor:

Malfunction of temperature sensor will be detected at any time;

(2) Indoor tube temperature sensor

Malfunction of temperature sensor won't be detected during defrosting period. It starts detecting the malfunction of temperature sensor after defrosting is finished for 5 mins. Malfunction of temperature sensor will be detected at any other time.

(3) Protection of temperature sensor

1. When the temperature sensor is detected short circuit for 30s successively:

The detected temperature by the temperature sensor is too high and the complete unit will stop operation, meanwhile, the protection and malfunction of temperature sensor will be displayed accordingly.

2. When the temperature sensor is detected open circuit for 30s successively: The unit will stop operation due to protection and the corresponding malfunction of temperature sensor will be displayed directly.

6. Compulsory operating function of indoor unit

(1) Enter into compulsory operation control

After the unit is energized for 5mins, press the light button on remote controller for 3 times in 3s successively to enter into Freon recovery mode. Fo will be displayed. When Freon recovery mode operated for 25mins, all loads will operate in cooling mode. (The setting fan speed is high fan speed and the setting temperature is 16℃)

(2) Exit the compulsory operation control

Freon recovery mode will be exited after receiving any signal from remote controller or button and then the unit will operate at the current setting command; Freon mode will also be exited after operating for 25mins and then the unit will be turned off.

Outdoor Units

1. Input Parameter Compensation and Calibration

(1) Check the input parameter compensation function

As the instruction feature of split unit, concerning the comfortable, in heating mode, the indoor ambient temperature of compressor stopping time is higher than preset temperature.

(2) Check effective judgment controls of parameters

Effective judgment function of the outdoor exhaust temperature thermo-bulb

When conditions a and b are satisfied, the outdoor exhaust temperature thermo-bulb is judged not to be connected into place, the mainboard of outer units will display failure of the outdoor exhaust temperature thermo-bulb (not connected into place), stop the unit for repairing, and resume it by remote controls of ON/OFF.

2. Basic Functions

(1) Cooling Mode

1. Conditions and processes of cooling operation:

(1) If the compressor is stop, and [Tpreset – (Tindoor ambient – ΔTcooling indoor ambient temperature compensation)] ≤ 0.5℃, start up the unit for cooling, and start to cooling operation;

(2) During operations of cooling, if 0℃ ≤ [Tpreset – (Tindoor ambient –ΔTcooling indoor ambient temperature compensation)] < 2℃, the cooling operation will be still running;

(3) During operations of cooling, if 2℃ ≤ [Tpreset – (Tindoor ambient –ΔTcooling indoor ambient temperature compensation)], the cooling operation will stop after reaching to the temperature point.

2. Temperature setting range

(1) If Toutdoor ambient ≥ [Tlow-temperature cooling], the temperature can be set at: 16~30℃ (Cooling at room temperature);

(2) If Toutdoor ambient < [Tlow-temperature cooling], the temperature can be set at: 25~30℃ (Cooling at low temperature), that is, the minimum setting temperature for outdoor unit judgment is 25℃.

(2) Dry Mode

1. Conditions and processes of dry operations: Same as the cooling mode;
2. The temperature setting range is: 16~30℃;

(3) Fan Mode

1. The compressor, outdoor fan and four-way valve are switched off;
2. The temperature setting range is: 16~30℃.

(4) Heating Mode

1. Conditions and processes of heating operations: (Tindoor ambient is the actual detection temperature of indoor environment thermo-bulb, ΔTheating indoor ambient temperature compensation is the indoor ambient temperature compensation during heating operations)

(1) If the compressor is stop, and [(Tindoor ambient –ΔTheating indoor ambient temperature compensation) –Tpreset] ≤ 0.5℃, start the machine to enter into heating operations for heating;

(2) During operations of heating, if 0℃ ≤ [(Tindoor ambient –ΔTheating indoor ambient temperature compensation) –Tpreset] < 2℃, the heating operation will be still running;

(3) During operations of heating, if 2℃ ≤ [(Tindoor ambient –ΔTheating indoor ambient temperature compensation) –Tpreset], the heating operation will stop after reaching the temperature point.

2. The temperature setting range in this mode is: 16~30℃.

(5) Defrosting Control

1. After the time for defrosting is judged to be satisfied, if the temperature for defrosting is satisfied after detections for continuous 3minutes, the defrosting operation will start.

2. Start to defrost: Compressor stops and starts up 55S later;

3. Defrosting finish: Compressor stops and starts up 55S later;

4. Conditions of finishing defrosting

The defrosting operation can exit when any of the conditions below is satisfied:

(1) Toutdoor pipe≥ 12℃;

(2) Toutdoor ambient＜-5℃, and the Toutdoor pipe≥ 6℃ last more than 80S;

(3) The continuous running time of defrosting reaches to 8min.

(6) Compressor Control

1. The frequency of compressor will be controlled with the relationship of ambient temperature and preset temperature and changing speed of ambient temperature;

2. Start the compressor after starting cooling, heating, dry operations, and the outdoor fan start for 5s;

3. When the unit is off, in safety stops and switching to fan mode, the compressor will stop immediately;

4. In all modes: once the compressor starts up, it will not be allowed to stop until having run for the [tmin. Compressor running time] (Note: including cases of shutdown when the temperature point is reached; except the cases requiring stopping the compressor such as fault protection, remote shutdown, mode switching etc.);

5. In all modes: once the compressor stops, it will be allowed be restart after 3-minute delay (Note: The indoor units have a function of power memory, the machine can be restarted after remote shutdown and powering up again without delay).

(7) Outdoor Fan Control

1. When the unit is off by remote control、in safety stops and stop after reaching to the temperature point.

2. In fan mode: The outdoor fan stops;

3. Start to defrost: Outdoor fan will stop after compressor stops for 50S;

4. Defrosting finish: Outdoor fan will start up when the compressor is stopping.

(8) 4-way valve control

1. The 4-way valve control under the modes of Cooling, dehumidification and fan: closing;

2. When the unit is on in heating mode, the 4-way valve is energized;

3. When the unit is on in heating mode and heating mode shift to other modes, the 4-way valve will be de-energized after compressor stops for 2min;

4. After protection stops, the 4-way valve will be de-energized after 4min;

5. Start to defrost: The power of 4-way valve will be de-energized after the compressor stops;

6. Defrosting finish: The 4-way valve will be energized after the compressor stops.

(9) Anti-freezing protection

1. In cooling and dry mode, if Tindoor pipe＜0 is detected for 3min continuously, the unit will stop; if ＜Tindoor pipe, and compressor has stopped for 3min, the unit will resume running;

2. In cooling and dry mode, if Tindoor pipe＜6, running frequency of compressor will be decreased or stop to increase will be occurred;

3. If the unit stops as anti-freezing protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF. During operation, if the time exceeds compressor running time, the time of anti-freezing protection stop will zero clearing. When the unit is off/ fan/ heating mode, the malfunction and malfunction times will zero clearing. (If the malfunction can not resume, the shifting mode can clear malfunction.)

(10) Overload protection

1. In cooling and dry mode: if ≤Toutdoor pipe, the unit will stop; if Toutdoor pipe＜, and compressor has stopped for 3min, the unit will resume running;

2. In cooling and dry mode: if ≤Toutdoor pipe, running frequency of compressor will be decreased or stop to increase will be occurred;

3. In heating mode: if ≤Tindoor pipe, the unit will stop; if Tindoor pipe＜, and compressor has stopped for 3min, the unit will resume running;

4. In cooling and dry mode: if ≤Tindoor pipe, running frequency of compressor will be decreased or stop to increase will be occurred;

5. If the unit stops as overload protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF. During operation, if the time exceeds compressor running time, the time of overload protection stop will zero clearing. When the unit is off/ fan/ shifts to heating mode, the malfunction and malfunction times will zero clearing. (If the malfunction can not resume, the shifting mode can clear malfunction.)

(11) Compressor discharge temperature protection

1. If ≤Tdischarge, the unit will stop; if Tdischarge＜, and compressor has stopped for 3min, the unit will resume running;

2. If ≤Tdischarge, running frequency of compressor will be decreased or stop to increase will be occurred;

3. If the unit stops as compressor discharge temperature for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF. During operation, if the time exceeds compressor running time, the time of compressor discharge temperature stop will zero clearing. When the unit is off/ shifts to fan mode, the malfunction and malfunction times will zero clearing. (If the malfunction can not resume, the shifting mode can clear malfunction.)

(12) Current protection

1. If 12A≤I alternating-current, running frequency of compressor will be decreased or stop to increase will be occurred;
2. If 17A≤I alternating-current, the unit will stop; and compressor has stopped for 3min, the unit will resume running;
3. If the unit stops as compressor discharge temperature for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF. During operation, if the time exceeds compressor running time, the time of compressor discharge temperature stop will zero clearing.

(13) Drop off voltage

During compressor operation, the system will stop and malfunction of drop off voltage if voltage downward fluctuates rapidly, and it will re-start up automatically 3min later.

(14) Communication malfunction

If the unit does not receive correct signal from indoor unit for 3min continuously, the unit will stop as communication malfunction protection; if communication malfunction resume and compressor has stopped for 3min, the unit will resume running.

(15) IPM module protection

When the compressor starts, if there is overcurrent or control voltage low for IPM module as some abnormal results, IPM will detect module protection signal as the unit is on. Once the module protective signal is detected, stop the unit with module protection immediately. If the module protection is resumed and compressor has stopped for 3min, the unit will be allowed to operate. If the module protection continuously occurs for three times, it should not be resumed automatically, and you should press the ON/OFF button to resume. If the running time of compressor exceeds the [t Protection times clearing of module], the module protection is cleared to recount.

(16) Module overheating protection

1. If ≤Tmodule, running frequency of compressor will be decreased or stop to increase will be occurred;
2. If ≤Tmodule, the unit will stop; if Tmodule＜, and compressor has stopped for 3min, the unit will resume running;
3. If the unit stops as module overheating protection for 6 times, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF. During operation, if the time exceeds compressor running time, the time of module overheating protection stop will zero clearing. When the unit is off/ shifts to fan mode, the malfunction and malfunction times will zero clearing. (If the malfunction can not resume, the shifting mode can clear malfunction.)

(17) Compressor overload protection

1. If the switch of compressor overload de-energized is detected for 3S continuously, the system will stop as protection;
2. If the overload protection is resumed and compressor has stopped for 3min, the unit will be allowed to operate.
3. If the unit stops as compressor overload protection occurred for 3 times continuously, it can not resume running automatically and display malfunction, it can resume by pressing ON/OFF; and the times of compressor overload protection will be cleared after the compressor has run for 30min.

7. Installation Manual

Important Notices

1. The unit installation work must be done by qualified personnel according to the local rules and this manual.

2. Before installing, please contact with local authorized maintenance center, if unit is not installed by the authorized maintenance center, the malfunction may not solved due to discommodious contacts.

3. When removing the unit to the other place, please firstly contact with the authorized Maintenance Center in the local area.

Basic Requirements For Installation Position

Install in the following place may cause malfunction. If it is unavoidable contact with service center please:

* Place where strong heat sources, vapors, flammable gas or volatile object are emitted.
* Place where high-frequency waves are generated by radio equipment, welders and medical equipment.
* Place where a lot of salinities such as coast exists.
* Place where the oil (machine oil) is contained in the air.
* Place where a sulfated gas such as the hot spring zones is generated.
* Other place with special circumstance.

7.1 Tools Required for Installation (not supplied)

1. Gauge manifold
2. Electronic balance for refrigerant charging
3. Phillips head screwdriver
4. Knife or wire stripper
5. Carpenter's level
9. Hammer
10. Drill
11. Tube cutter
12. Tube flaring tool
13. Torque wrench
14. Adjustable wrench
15. Reamer (for deburring)
16. Vacuum pump (For R410A)
17. Gas leakage detector

7.2 Installation Position Selection

1. Indoor Unit

(1)The air inlet and outlet vent should be far from the obstruction, and make sure that the air can be blown through the whole room.

(2)Select a position where the condensing water can be easily drained out, and the place is easily connected for outdoor unit.

(3)Select a location where the children can not reach.

(4)Can select the place where is strong enough to withstand the full weight and vibration of the unit.

(5)Be sure to leave enough space to allow access for routine maintenance. The height of the installed location should be 250cm or more from the floor.

(6)Select a place about 1m or more away from TVset or any other electric appliances.

(7)Select a place where the filter can be easily taken out.

(8)Make sure that the indoor unit installation should accord with installation dimension diagram requirements.

(9)Do not use the unit in the immediate surroundings of a laundry a bath a shower or a swimming pool.

2. Outdoor Unit

(1)Select a location from which noise and outflow air emitted by unit will not annoy neighbors, animals, plants.

(2)Select a location where there should be sufficient ventilation.

(3)Select a location where there should be no obstructions cover the inlet and outlet vent.

(4)The location should be able to withstand the full weight and vibration of the outdoor unit and permit safe installation.

(5)Select a dry place, but do not expose the unit under the direct sunlight or strong wind.

(6)Make sure that the outdoor unit installation dimension should accord with installation dimension diagram, convenient for maintenance, repair.

(7)The height difference of connecting the tubing within 5m, the length of connecting the tubing within 10m.

(8)Select a place where it is out of the reach for children.

(9)Select a place where will not block the passage and do not influence the city appearance.

7.3 Installation of Indoor Unit

1. Installing the mounting plate

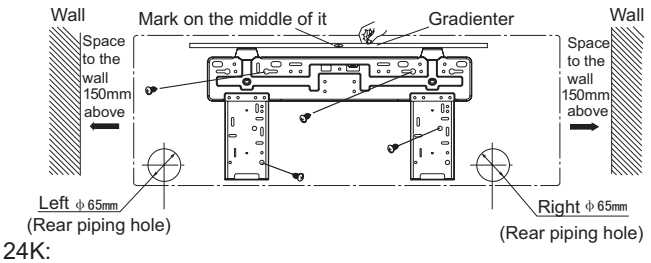
The mounting plate should be installed on a wall which can support the weight of the indoor unit.

1) Temporarily secure the mounting plate to the wall, make sure that the panel is completely level, and mark the boring points on the wall.

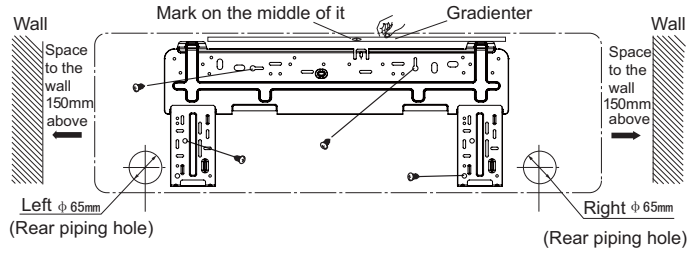
2) Secure the mounting plate to the wall with screws.

Recommended mounting plate retention spots and dimensions

18K:



24K:



2. Boring a wall hole and installing wall embedded pipe

• For walls containing metal frame or metal board, be sure to use a wall embedded pipe and wall cover in the feed-through hole to prevent possible heat, electrical shock, or fire.

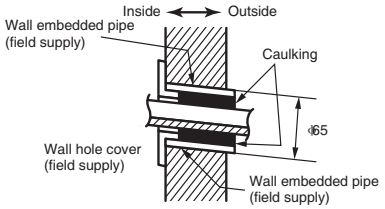
• Be sure to caulk the gaps around the pipes with caulking material to prevent water leakage.

1) Bore a feed-through hole of 65mm in the wall so it has a down slope toward the outside.

2) Insert a wall pipe into the hole.

3) Insert a wall cover into wall pipe.

4) After completing refrigerant piping, wiring, and drain piping, caulk pipe hole gap with putty.



3. Flaring work and connection of piping

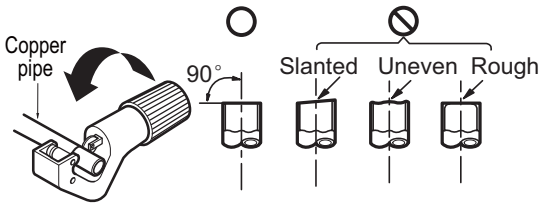
3.1 Flaring work

Flaring work

Main cause for refrigerant leakage is due to defect in the flaring work. Carry out correct flaring work using the following procedure.

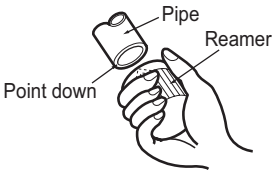
Cut the pipes and the cable

1. Use the piping kit accessory or pipes purchased locally.
2. Measure the distance between the indoor and the outdoor unit.
3. Cut the pipes a little longer than the measured distance.
4. Cut the cable 1.5m longer than the pipe length.



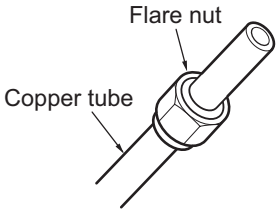
Burr removal

1. Completely remove all burrs from the cut cross section of pipe/tube.
2. Put the end of the copper tube/pipe in a downward direction as you remove burrs in order to avoid dropping burrs into the tubing.



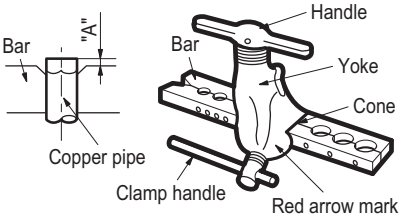
Putting nut on

Remove flare nuts attached to indoor and outdoor unit, then put them on pipe/tube having completed burr removal. (not possible to put them on after flaring work)



Flaring work

Firmly hold copper pipe in a die in the dimension shown in the table above.

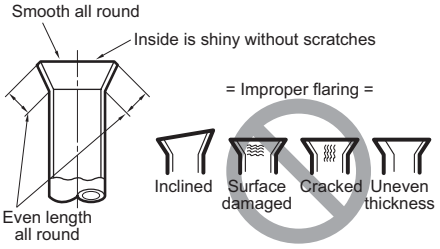


Carry out flaring work using flaring tool as shown below.

Outside diameter		A
mm	inch	mm
Ø6.35	1/4	0~0.5
Ø9.52	3/8	0~0.5
Ø12.7	1/2	0~0.5
Ø15.88	5/8	0~1.0
Ø19.05	3/4	1.0~1.3

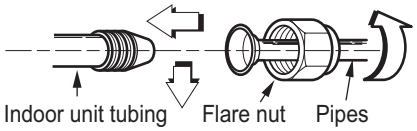
Check

1. Compare the flared work with figure below.
2. If flare is noted to be defective, cut off the flared section and re-flare it.

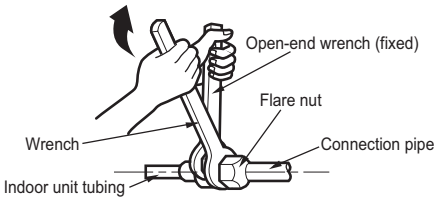


3.2 Connection of piping

1. Align the center of the pipes and sufficiently tighten the flare nut by hand.



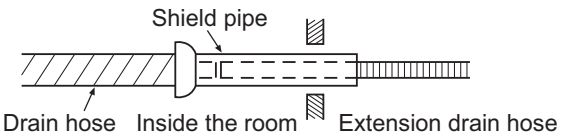
2. Tighten the flare nut with a wrench.



Outside diameter		Torque
mm	inch	kg·m
Ø6.35	1/4	1.8
Ø9.52	3/8	4.2
Ø12.7	1/2	5.5
Ø15.88	5/8	6.6
Ø19.05	3/4	6.6

4. Drain hose junction

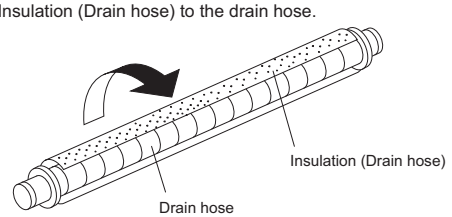
If drain hose extension or embedded drain piping is required, use appropriate parts that match the hose front end.
Insert drain hose into the handle of drain pan, and join drain hose and connecting hose according to the figure by.



⚠ CAUTION

Insert the drain hose and drain cap into the drain port, making sure that it comes in contact with the back of the drain port, and then mount it. If the drain hose is not connected properly, leaking will occur.

• Attach the Insulation (Drain hose) to the drain hose.



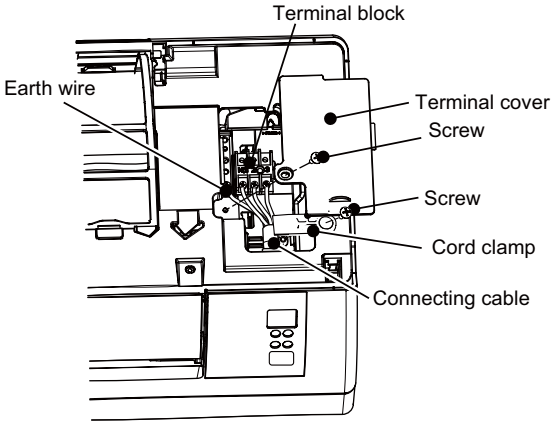
5. Wiring Connection

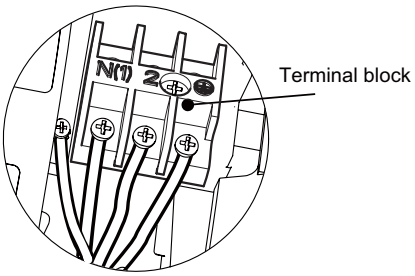
Wiring the connecting cable can be carried out without removing the front panel.

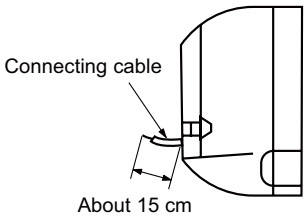
1. Remove the air inlet grille. Open the air inlet grille upward and pull it toward you.
2. Remove the terminal cover and cord clamp.
3. Insert the connecting cable (or as according to local regulations/codes) into the pipe hole on the wall.
4. Pull the connecting cable through the cable slot on the rear panel so that it protrudes about 15cm out of the front.
5. Insert the connecting cable fully into the terminal block and secure it tightly with screws.
6. Tightening torque: 1.2 N•m (0.12 kgf•m).
7. Secure the connecting cable with the cord clamp.
8. Attach the terminal cover, rear plate bushing and air inlet grille on the indoor unit.

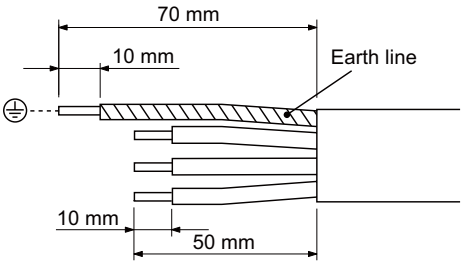
CAUTION

• Be sure to refer to the wiring system diagram labeled inside the front panel.
• Check local electrical regulations for any specific wiring instructions or limitations.









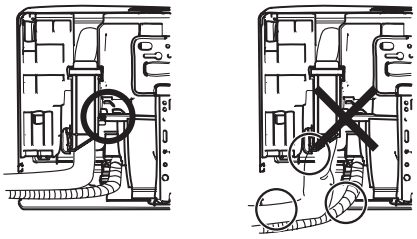
5. Installing indoor unit

In the case of bending or curing refrigerant pipes, keep the following precautions in mind.

Abnormal sound may be generated if improper work is conducted.

1) Do not strongly press the refrigerant pipes onto the bottom frame.

2) Do not strongly press the refrigerant pipes on the front grille, either.



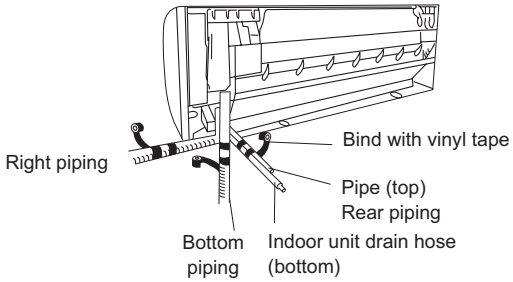
The piping can be lead out from right, right rear, left and left rear.

Right-side, right-back, or right-bottom piping

1)After making slits on the front panel with a knife or similar tool, cut them out with a pair of nippers or an equivalent tool.

Attach the drain hose to the underside of the refrigerant pipes with an adhesive vinyl tape.

2) Wrap the refrigerant pipes and drain hose together with an insulation tape.



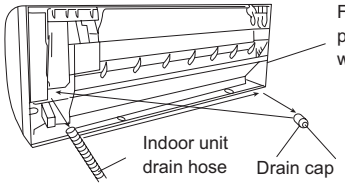
Left-side, left-back, or left-bottom piping

• Interchange the drain cap and the drain hose.

⚠ CAUTION

(1) In order to align the drain hose and drain cap, be sure to insert securely and vertically. Incline insertion will cause water leakage.
(2) When inserting, be sure not to attach any material besides water. If any other material is attached, it will cause deterioration and water leakage.
(3) After removing drain hose, be sure not to forget mounting drain cap.
(4) Be sure to fix the drain hose with tape to the bottom of piping.

(5) Prevent drain water frozen under low temperature environment.
When installing indoor unit's drain hose outdoors, necessary measure for frost protection should be taken to prevent drain water frozen.
• Under low temperature environment (when outdoor temperature under 32 °F), after cooling operation is executed, water in the drain hose could be frozen.
Once drain water is frozen, the drain hose will be blocked and water leakage may be resulted for indoor unit.



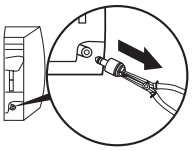
For left outlet piping, cut off the piping outlet cutting groove with a hacksaw.

Remove the drain cap by pulling at the projection at the end of the cap with pliers, etc.

How to replace the drain plug and drain hose

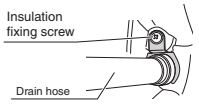
• How to remove the drain cap

Clamp drain cap with needle-nose pliers, and pull it out.



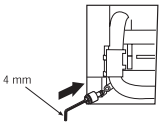
• How to remove the drain hose

The drain hose is secured in place by a screw. Remove the screw securing the drain hose, then pull out the drain hose.

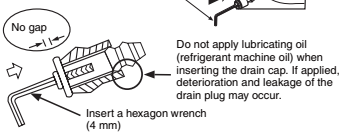


• How to attach the drain cap

1. Insert hexagonal wrench (4 mm).



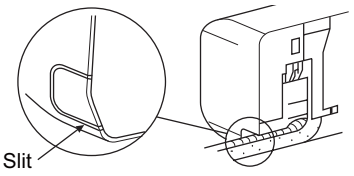
2. Firmly insert drain cap.


No gap
Do not apply lubricating oil (refrigerant machine oil) when inserting the drain cap. If applied, deterioration and leakage of the drain plug may occur.
Insert a hexagon wrench (4 mm)

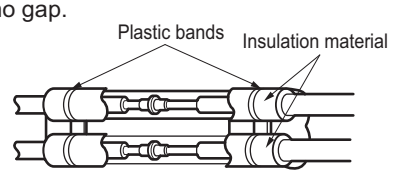
• How to attach the drain hose

Insert the drain hose firmly until the connector contacts the insulation, then secure it in place using the original screw.

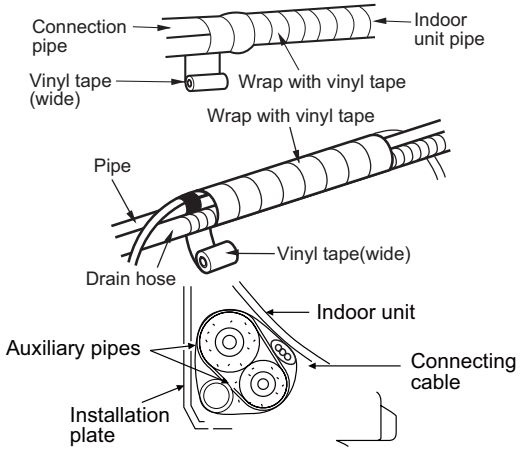
1. After making slits on the front panel with a knife or similar tool, cut them out with a pair of nippers or an equivalent tool.



2. Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there is no gap.



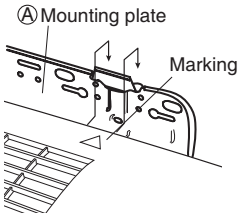
3. Wrap the area which accommodates the rear piping housing section with vinyl tape.



4. Bundle the piping and drain hose together by wrapping them with vinyl tape for enough to cover where they fit into the rear piping housing section.

Indoor unit installation

1) Pass the drain hose and refrigerant pipes through the wall hole, then set the indoor unit on the mounting plate hooks by using the markings at the top of the indoor unit as a guide.

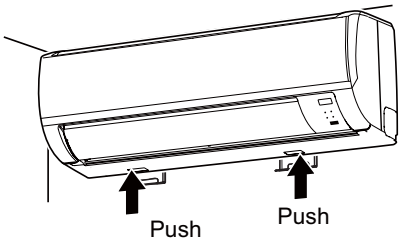


2) Swing the indoor unit to right and left to confirm that it is firmly hooked on the installation plate.

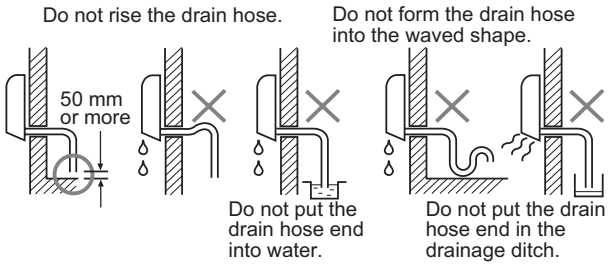
3)While pressing the indoor unit onto the wall, hook it at the lower part on the installation plate.

Pull the indoor unit toward you to confirm that it is firmly hooked on the installation plate.

For detaching the indoor unit from the installation plate pull the indoor unit toward you while pushing the bottom up at the specified places.



4)Run the drain hose at a downward sloped angle.


Do not rise the drain hose.
Do not form the drain hose into the waved shape.
50 mm or more
Do not put the drain hose end into water.
Do not put the drain hose end in the drainage ditch.

5)Put water in the drain pan and make sure that the water is being drained outside.

Caution:

Install the drain pipe for proper drainage. Improper drainage can result in water dripping inside the room.

7.4 Installation of Outdoor Unit

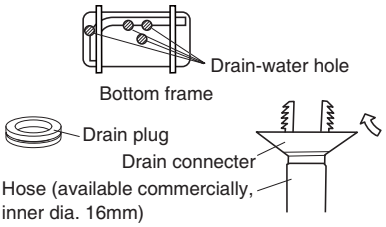
4.1 Draining the Water

* Holes are provided on the base plate of the outdoor unit to ensure that the defrost water produced during heating operations is drained off efficiently.

* If a centralized drain is required when installing the unit on a balcony or wall.

* If the drain port is covered by a mounting base or floor surface, place additional foot bases of at least 30mm in height under the outdoor unit's feet.

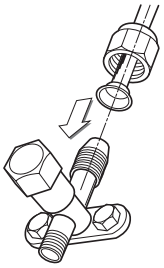
* In cold areas, do not use a drain hose with the outdoor unit. (Otherwise, drain water may freeze, impairing heating performance.)



4.2 Refrigerant Piping Connection

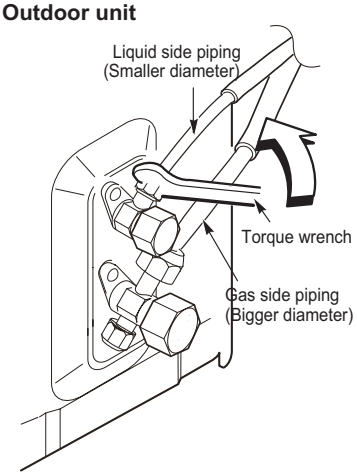
Remove the Valve cover from the unit by loosening the screw.

Align the center of the pipings and sufficiently tighten the flare nut by hand.



Finally, tighten the flare nut with torque wrench until the wrench clicks.

Outdoor unit



2. Overlap the connection pipe insulation material and the indoor unit pipe insulation material. Bind them together with vinyl tape so that there is no gap.

4.3 Evacuation

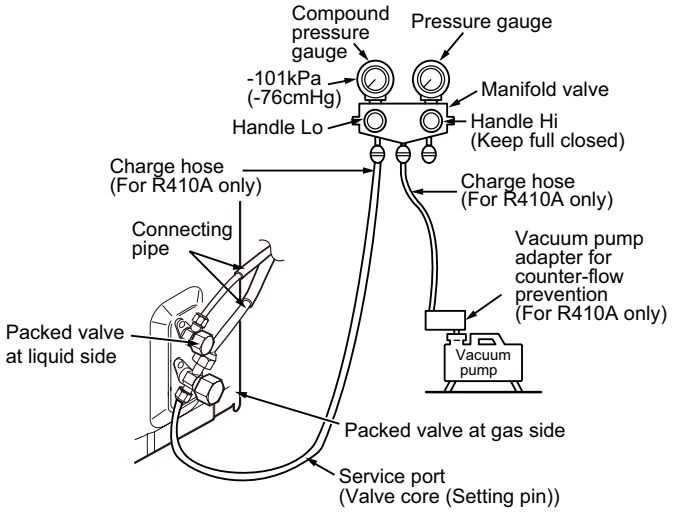
After the piping has been connected to the indoor unit, perform the air purge.

> **AIR PURGE**
>
> Evacuate the air in the connecting pipes and in the indoor unit using a vacuum pump.
>
> Do not use the refrigerant in the outdoor unit.
>
> For details, see the vacuum pump manual.

Air purging with vacuum pump

Be sure to use a vacuum pump with counter-flow prevention function so that oil inside the pump does not flow back into the air conditioner pipes when the pump stops. (If oil inside the vacuum pump enters into the air conditioner circuit which uses R410A, trouble with the refrigeration system may develop.)

1. Connect the charge hose from the manifold valve to the service port of the gas side packed valve.
2. Connect the charge hose to the port of the vacuum pump.
3. Open fully the low pressure side handle of the gauge manifold valve.
4. Operate the vacuum pump to begin evacuating. Perform evacuating for about 15 minutes if the piping length is 20 meters (15 minutes for 20 meters) (assuming a pump capacity of 27 liters per minute). Confirm that the compound pressure gauge reading is –101 kPa (–76 cmHg).
5. Close the low pressure valve handle of gauge manifold.
6. Open fully the valve stem of the packed valves (both sides of Gas and Liquid).
7. Remove the charging hose from the service port.
8. Securely tighten the caps on the packed valves.



CAUTION

• IMPORTANT POINTS FOR PIPING WORK

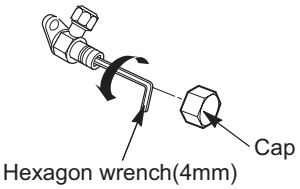
1. Keep dust and moisture from entering the pipes.
2. Tighten connections carefully (between pipes and unit).
3. Evacuate the air in the connecting pipes using a VACUUM PUMP.
4. Check for gas leaks at all connections.

Packed Valve handling precautions

• Open the valve stem all the way; but do not try to open it beyond the stopper.

• Securely tighten the valve stem cap with torque in the following table:

Gas side (Ø9.52 mm)	33 to 42 N•m (3.3 to 4.2 kgf•m)
Liquid side (Ø6.35 mm)	14 to 18 N•m (1.4 to 1.8 kgf•m)
Service port	14 to 18 N•m (1.4 to 1.8 kgf•m)

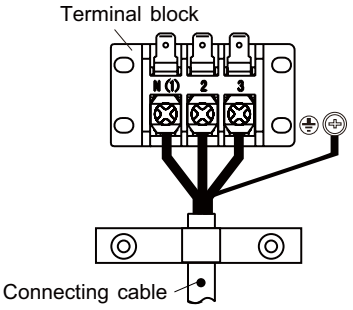


4.4 Wiring Connection

1) Strip the insulation from the wire (20mm).

2) Connect the connection wires between the indoor and outdoor units so that the terminal numbers match. Tighten the terminal screws securely.

The screws are packed with the terminal board.

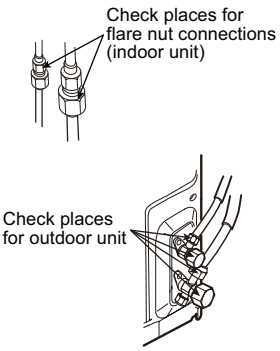


7.5 Test Operation

1. Check that all tubing and wiring have been properly connected.
2. Check that the gas and liquid side service valves are fully open.

5.1 Gas Leak Test

Check the flare nut connections for gas leaks with a gas leak detector and/or soapy water.



5.2 Test Running

1)Switch on power, press “ON/OFF” button on the wireless remote control to start the operation.

2)Press MODE button, to select the COOL, HEAT (Cooling only unit is not available), FAN to check whether the operation is normal or not.

Perform test operation and check items 1 and 2 below.

1. INDOOR UNIT

(1) Is operation of each button on the remote control unit normal?
(2) Does each lamp light normally?
(3) Do the air flow-direction louver operate normally?
(4) Is the drain normal?

2. OUTDOOR UNIT

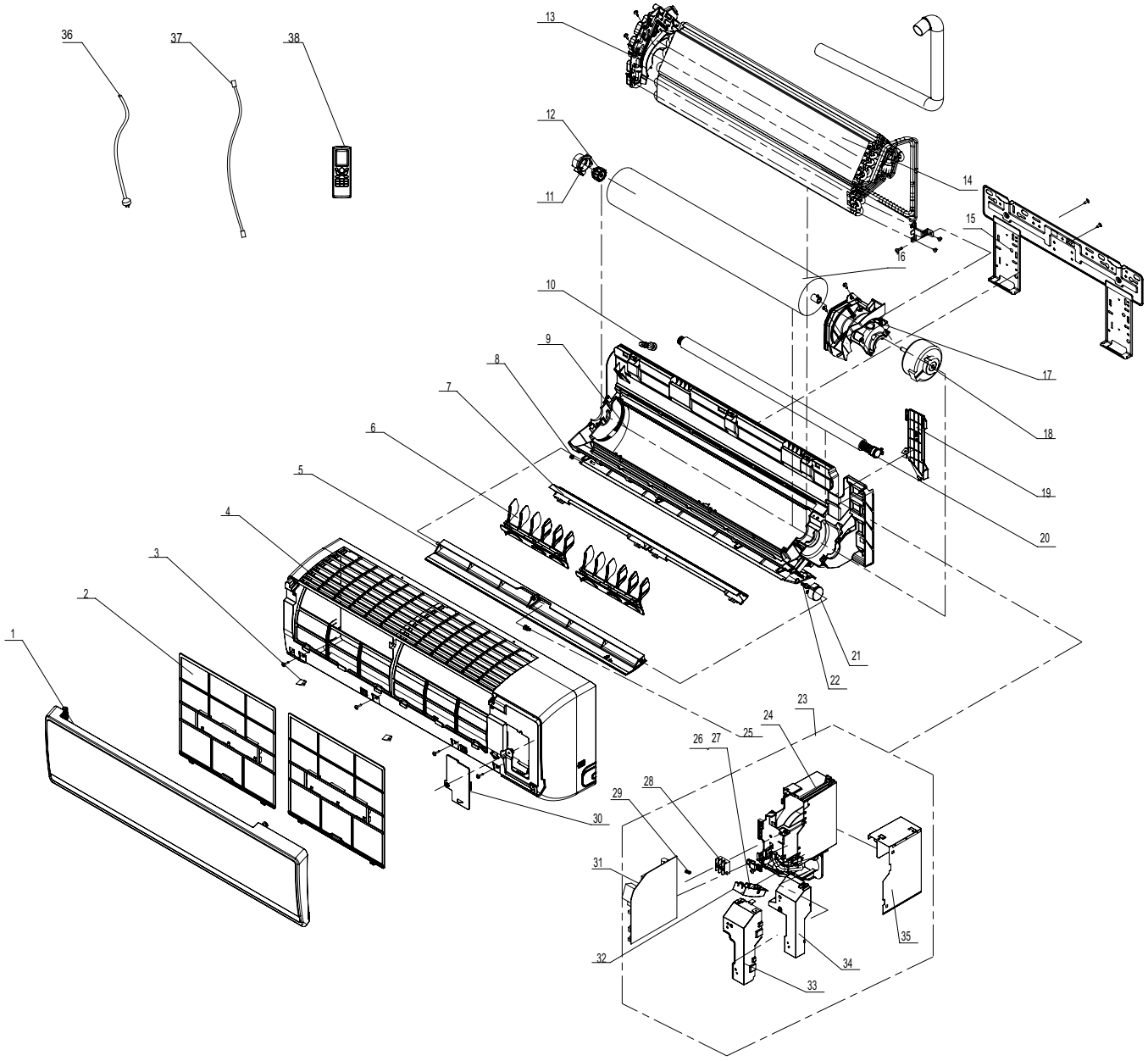
(1) Is there any abnormal noise and vibration during operation?
(2) Will noise, wind, or drain water from the unit disturb the neighbors?
(3) Is there any gas leakage?

8. Exploded Views and Parts List

8.1 Exploded View

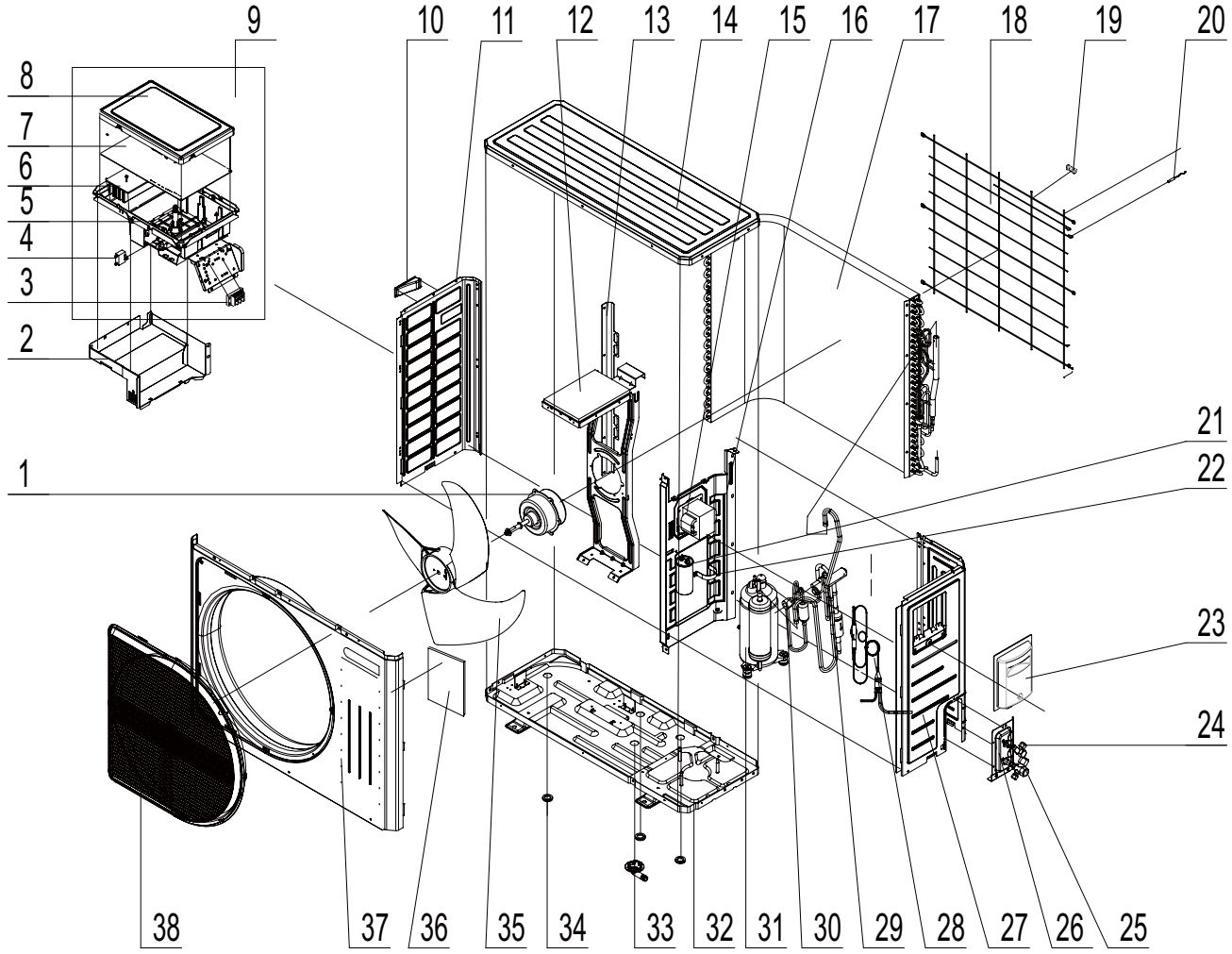
● **Indoor Unit**

(1) 18K



● **Outdoor Unit**

(1) 18K



8.2 Parts List

● **Indoor Unit**

(1) 18K

No	Description	Part Code	Qty
		GAN-A180GVR	
	Product Code	CB146N0360	
1	Front Panel	20012595	1
2	Filter Sub-Assy	11122104	2
3	Screw Cover	242520041	1
4	Front Case Assy	20012608	1
5	Guide Louver	10512140	1
6	Air Louver	10512160	2
7	Helicoid tongue	26112232	1
8	Left Axile Bush	10512037	1
9	Rear Case assy	22202154	1
10	Rubber Plug (Water Tray)	76712012	1
11	O-Gasket sub-assy of Bearing	76512051	1
12	O-Gasket of Cross Fan Bearing	76512203	1
13	Evaporator Support	24212119	1
14	Cold plasma generator sub-assy	1114000901	1
15	Evaporator Assy	01002603	1
16	Wall Mounting Frame	01252484	1
17	Cross Flow Fan	10352036	1
18	Motor Press Plate	26112231	1
19	Fan Motor	15012116	1
20	Pipe Clamp	26112164	1
21	Drainage hose	0523001407	1
22	Step Motor	15012086	1
23	Crank	10582070	1
24	Electric Box Assy	20202486	1
25	Electric Box	20112103	1
26	Axile Bush	10542008	1
27	Indicator Light Cover	22242084	1
28	Indicator shield cover	22242083	1
29	Terminal Board	4201026601	1
30	Jumper	4202300122	1
31	Electric Box Cover2	20122142	1
32	Main Board	30138673	1
33	Display Board	30568133	1
34	Shield Cover of Electric box Cover	01592088	1
35	Electric Box Cover	20122123	1
36	Shield cover of Electric Box	01592087	1
37	Power Cord	400204873	1
38	Connecting Cable	400205382	1
39	Remote Controller	30510061	1

The above data are subject to be changed without notice.

● **Outdoor Unit**

(1) 18K

No	Description	Part Code	Qty
		GAG-A180GVR	
	Product Code	CB146W0360	
1	Fan Motor	1501506301	1
2	Electric box (fireproofing)	01413148	1
3	Terminal Board	42011113	1
4	Capacitor CBB61	33010010	1
5	Electric Box	20113008	1
6	Radiator	49010252	1
7	Main Board	30138568	1
8	Electric Box Cover Sub-Assy	02603217	1
9	Electric Box Assy	02603337	1
10	left handle	26235401	1
11	Left Side Plate	01305041P	1
12	Motor Support Sub-Assy	01705020	1
13	Supporting board(condenser)	01795010	1
14	Top Cover	01255005P	1
15	Reactor	43130021	1
16	Clapboard Sub-Assy	01232902	1
17	Condenser Assy	01113635	1
18	Rear Grill	01473043	1
19	Wiring clamp	26115004	1
20	Temperature Sensor	3900030901	1
21	Capacitor CBB65	33000065	1
22	Capacitor Clamp sub-assy	01413098	1
23	Handle	26235254	1
24	Cut-off valve Sub-Assy	07133204	1
25	Cut-off valve Sub-Assy	07133060	1
26	Valve support assy	01715010P	1
27	Right Side Plate	01305053P	1
28	Capillary Sub-Assy	03063168	1
29	4-way Valve Assy	0312324501	1
30	Magnet Coil	4300040033	1
31	Compressor and fittings	00103501	1
32	Chassis Sub-assy	0120371401P	1
33	Drainage Connecter	06123401	1
34	Drainage Plug	06813401	3
35	Axial Flow Fan	10335008	1
36	Insulated board (cover of electric box)	20113003	1
37	Front Panel	01535009P	1
38	Front grill	22415008	1

The above data are subject to be changed without notice.

9. Troubleshooting

9.1 Precautions before Performing Inspection or Repair

Be cautious during installation and maintenance. Do operation following the regulations to avoid electric shock and casualty or even death due to drop from high attitude.

* Static maintenance is the maintenance during de-energization of the air conditioner.

For static maintenance, m ake sure that the unit is de-energized and the plug is disconnected.

*dynamic maintenance is the maintenance during energization of the unit.

Before dynamic maintenance, check the electricity and ensure that there is ground wire on the site. Check if there is electricity on the housing and connection copper pipe of the air conditioner with voltage tester. After ensure insulation place and the safety, the maintenance can be performed.

Take sufficient care to avoid directly touching any of the circuit parts without first turning off the power.

At times such as when the circuit board is to be replaced, place the circuit board assembly in a vertical position.

Normally,diagnose troubles according to the trouble diagnosis procedure as described below.(Refer to the check points in servicing written on the wiring diagrams attached to the indoor/outdoor units.)

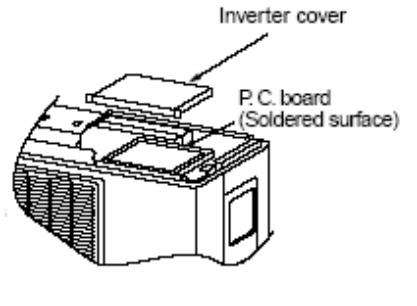
No.	Troubleshooting procedure
1	Confirmation
2	Judgement by Flashing LED of Indoor/Outdoor Unit
3	How to Check simply the main part

NOTE:

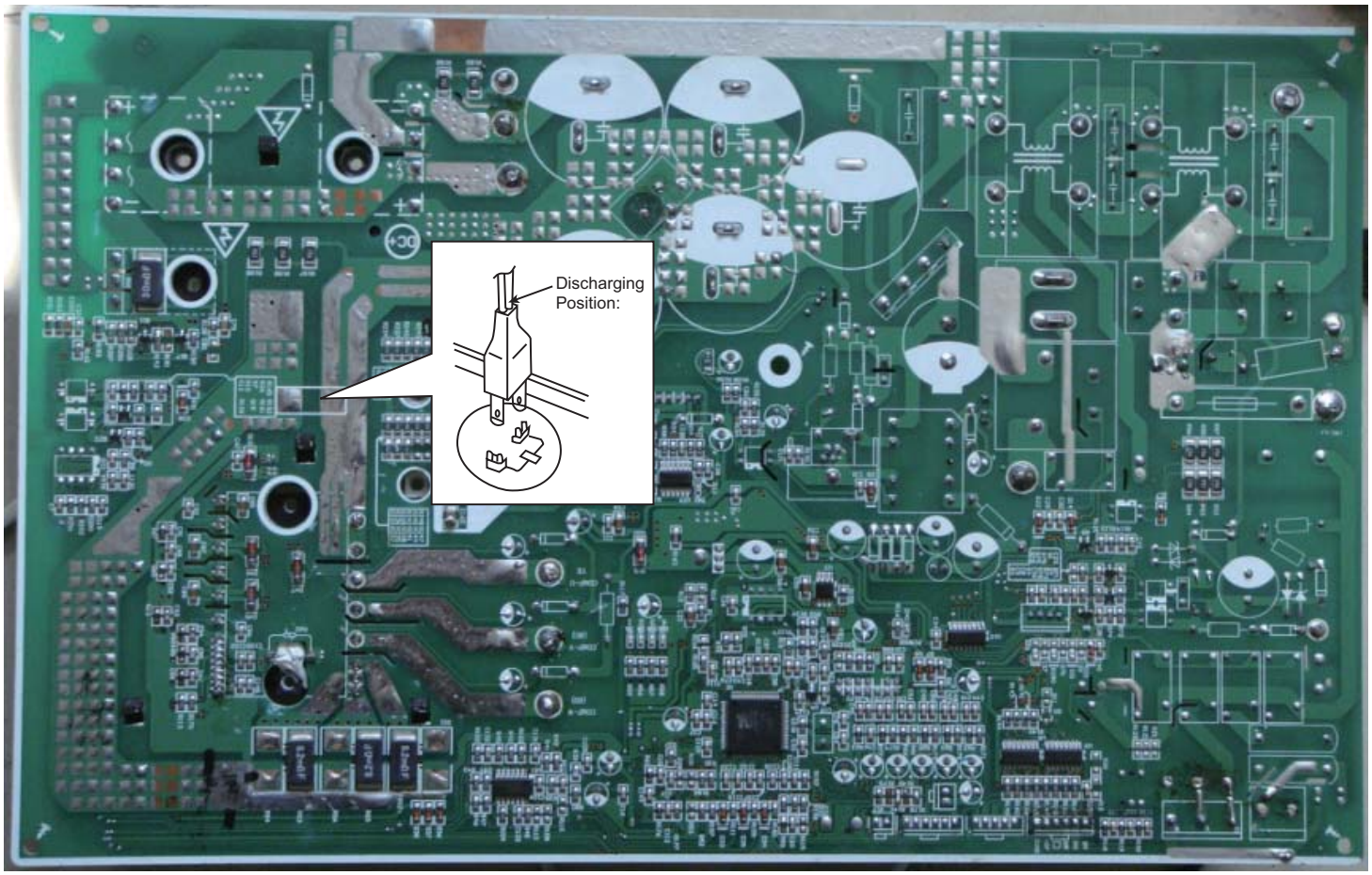
A large-capacity electrolytic capacitor is used in the outdoor unit controller(inverter).Therefore,if the power supply is turned off,charge(charging voltage DC280V to 380V)remains and discharging takes a lot of time.. After turning off the power source,if touching the charging section before discharging, an electrical shock may be caused. Discharge the electrolytic capacitor completely by using soldering iron,etc.

<Discharging method>

(1)remove the inverter cover(Outdoor Unit)



(2)As shown below,connect the discharge resistance (approx.100Ω, 20W)or plug of the soldering iron to voltage between + - terminals of the electrolytic capacitor (test 3 “D” and “E” point) on PC Board for 30s, and then peformer discharging.



9.2 Confirmation

(1)Confirmation of Power Supply

Confirm that the power breaker operates(ON) normally;

(2)Confirmation of Power Voltage

Confirm that power voltage is AC 220-230-240 ±10%. If power voltage is not in this range, the unit may not operate normally.

9.3 Blinking LED of Indoor/Outdoor Unit and Primary Judgement

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit Indicator has 3 kinds of display status and they will be displayed circularly every 5s. □OFF ■ON ☆Blink				A/C status	Possible Reasons
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)								
			Operation Indicator	COOL Indicator	Heating Indicator	D40	D41	D42	D43		
1	High pressure protection of system	E1	OFF 3s and blink once			□	☆	☆	☆	During cooling and drying operation, except indoor fan operates, all loads stop operation. During heating operation, the complete unit stops.	Possible reasons: 1. Refrigerant was superabundant; 2. Poor heat exchange (including filth blockage of heat exchanger and bad radiating environment); Ambient temperature is too high.
2	Antifreezing protection	E2	OFF 3S and blink twice			■	□	■	□	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates.	1. Poor air-return in indoor unit; 2. Fan speed is abnormal; 3. Evaporator is dirty.
3	High discharge temperature protection of compressor	E4	OFF 3S and blink 4 times			■	□	■	☆	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	Please refer to the malfunction analysis (discharge protection, overload).
4	Overcurrent protection	E5	OFF 3S and blink 5 times			□	■	☆	□	During cooling and drying operation, compressor and outdoor fan stop while indoor fan operates. During heating operation, all loads stop.	1. Supply voltage is unstable; 2. Supply voltage is too low and load is too high; 3. Evaporator is dirty.
5	Communication Malfunction	E6	OFF 3S and blink 6 times			□	□	□	☆	During cooling operation, compressor stops while indoor fan motor operates. During heating operation, the complete unit stops.	Refer to the corresponding malfunction analysis.
6	High temperature resistant protection	E8	OFF 3S and blink 8 times			■	□	■	■	During cooling operation: compressor will stop while indoor fan will operate. During heating operation, the complete unit stops.	Refer to the malfunction analysis (overload, high temperature resistant).
7	Circuit PG motor (indoor fan) has circuit malfunction by zero cross detection	U8	OFF 3S and blink for 17 times							Operation of remote controller or control panel is available, but the unit won't act.	1. Control board is damaged.
8	PG motor (indoor fan motor) does not operate	H6	OFF 3S and blink 11 times							The complete unit will stop operation.	Poor connection for PGF in circuit diagram; Malfunction of indoor unit's control panel AP1; Malfunction of indoor unit's motor M1.
9	Malfunction protection of jumper cap	C5	OFF 3S and blink 15 times							The complete unit will stop operation.	Poor connection for the jumper cap on indoor unit's control panel AP1; please reinsert or replace the jumper cap;
10	Indoor ambient temperature sensor is open/short circuited	F1		OFF 3S and blink once						During cooling and drying operation, indoor unit operates while other loads will stop; during heating operation, the complete unit will stop operation.	1.Room temperature sensor hasn't been connected well with indoor unit's control panel AP1 (refer to the wiring diagram for indoor unit); 2.Room temperature sensor is damaged (please refer to the resistance table of temperature sensor)
11	Indoor evaporator temperature sensor is open/short circuited	F2		OFF 3S and blink twice						During cooling and drying operation, indoor unit will operate while other loads will stop; During heating operation, the complete unit will stop operation.	1.Room temperature sensor hasn't been connected well with indoor unit's control panel AP1 (refer to the wiring diagram for indoor unit); 2.Room temperature sensor is damaged (please refer to the resistance table of temperature sensor)

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit Indicator has 3 kinds of display status and they will be displayed circularly every 5s. □OFF ■ON ☆Blink				A/C status	Possible Reasons
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)								
			Operation Indicator	COOL Indicator	Heating Indicator	D40	D41	D42	D43		
12	Outdoor ambient temperature sensor is open/short circuited	F3		OFF 3S and blink 3 times		□	□	☆	■	During cooling and drying operating, compressor stops while indoor fan operates; During heating operation, the complete unit will stop operation	Outdoor temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
13	Outdoor condenser temperature sensor is open/short circuited	F4		OFF 3S and blink 4 times		□	□	☆	□	During cooling and drying operation, compressor stops while indoor fan will operate; During heating operation, the complete unit will stop operation.	Outdoor temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor)
14	Outdoor discharge temperature sensor is open/short circuited	F5		OFF 3S and blink 5 times		□	□	☆	☆	During cooling and drying operation, compressor will sop after operating for about 3 mins, while indoor fan will operate; During heating operation, the complete unit will stop after operating for about 3 mins.	1.Outdoor temperature sensor hasn't been connected well or is damaged. Please check it by referring to the resistance table for temperature sensor) 2.The head of temperature sensor hasn't been inserted into the copper tube
15	Limit/decrease frequency due to overload	F6		OFF 3S and blink for 6 times		■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
16	Decrease frequency due to overcurrent	F8		OFF 3S and blink 8 times		■	■	□	■	All loads operate normally, while operation frequency for compressor is decreased	The input supply voltage is too low; System pressure is too high and overload
17	Decrease frequency due to high air discharge	F9		OFF 3S and blink 9 times		■	■	□	□	All loads operate normally, while operation frequency for compressor is decreased	Overload or temperature is too high; Refrigerant is insufficient; Malfunction of electric expansion valve (EKV)
18	Voltage for DC bus-bar is too high	PH		OFF 3S and blink 11 times		□	■	□	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 265VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if it's normal, there's malfunction for the circuit, please replace the control panel (AP1)
19	Malfunction of complete unit's current detection	U5		OFF 3S and blink 13 times		□	■	☆	■	During cooling and drying operation, the compressor will stop while indoor fan will operate; During heating operating, the complete unit will stop operation.	There's circuit malfunction on outdoor unit's control panel AP1, please replace the outdoor unit's control panel AP1.
20	Overcurrent protection of phase current for compressor	P5		OFF 3S and blink 15 times		□	☆	□	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
21	Defrosting	H1			OFF 3S and blink once					Defrosting will occur in heating mode. Compressor will operate while indoor fan will stop operation.	It's the normal state
22	Static dedusting protection	H2			OFF 3S and blink twice						/

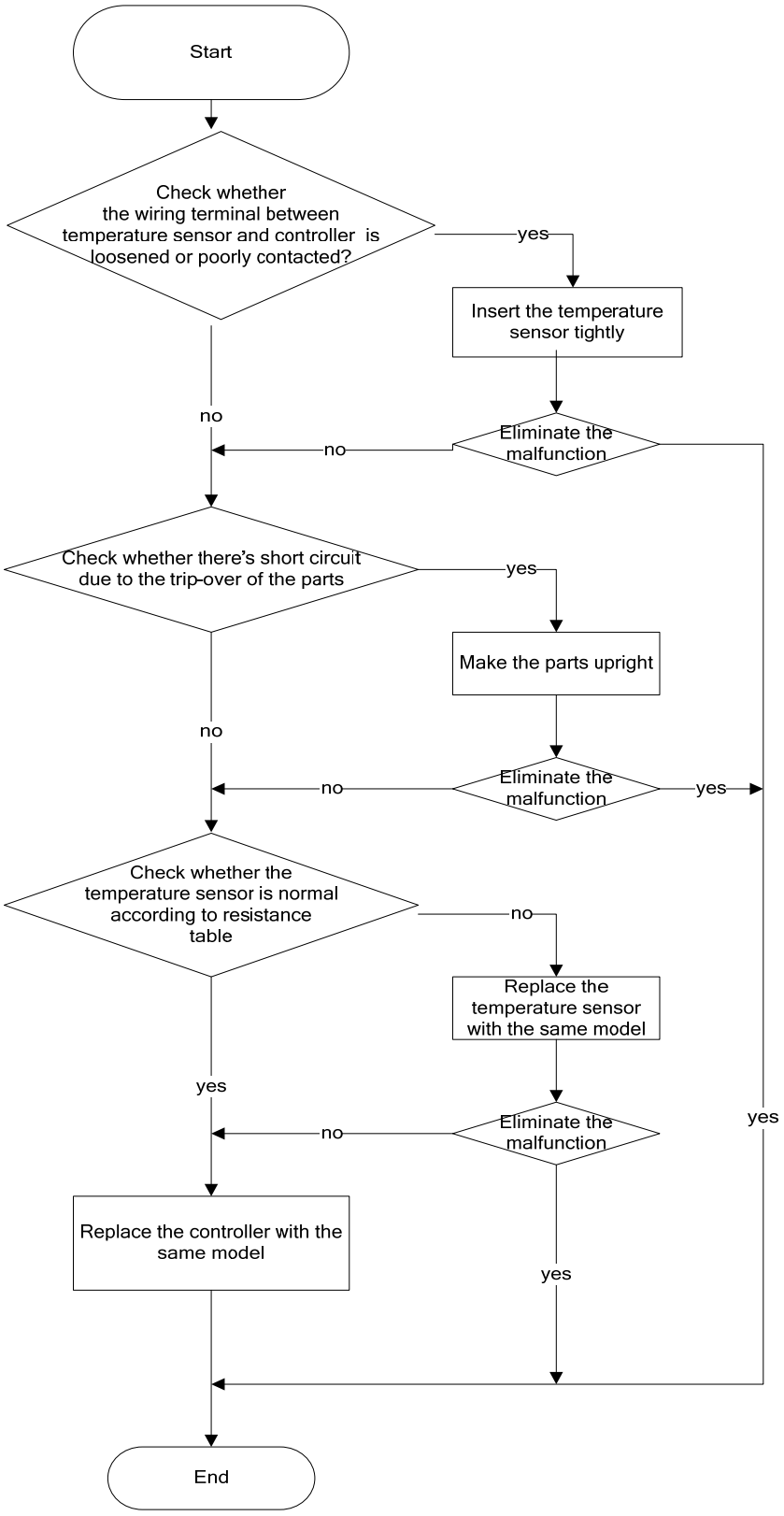
No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit Indicator has 3 kinds of display status and they will be displayed circularly every 5s. □OFF ■ON ☆Blink				A/C status	Possible Reasons
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)								
			Operation Indicator	COOL Indicator	Heating Indicator	D40	D41	D42	D43		
23	Overload protection for compressor	H3			OFF 3S and blink 3 times	□	☆	☆	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	1. Wiring terminal OVC-COMP is loosened. In normal state, the resistance for this terminal should be less than 1ohm. 2.Refer to the malfunction analysis (discharge protection, overload)
24	System is abnormal	H4			OFF 3S and blink 4 times	■	□	■	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (overload, high temperature resistant)
25	IPM protection	H5			OFF 3S and blink 5 times	□	☆	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
26	PFC protection	HC			OFF 3S and blink 6 times	□	■	☆	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
27	Desynchronizing of compressor	H7			OFF 3S and blink 7 times	□	☆	■	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis (IPM protection, loss of synchronism protection and overcurrent protection of phase current for compressor.
28	Decrease frequency due to high temperature resistant during heating operation	H0			OFF 3S and blink 10 times	■	□	☆	☆	All loads operate normally, while operation frequency for compressor is decreased	Refer to the malfunction analysis (overload, high temperature resistant)
29	Failure start-up	Lc			OFF 3S and blink 11 times	□	☆	□	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop operation.	Refer to the malfunction analysis
30	Malfunction of phase current detection circuit for compressor	U1			OFF 3S and blink 13 times	□	☆	■	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
31	EEPROM malfunction	EE			OFF 3S and blink 15 times	□	□	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
32	Charging malfunction of capacitor	PU			OFF 3S and blink 17 times	□	■	□	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Refer to the part three—charging malfunction analysis of capacitor

No.	Malfunction Name	Display Method of Indoor Unit				Display Method of Outdoor Unit Indicator has 3 kinds of display status and they will be displayed circularly every 5s. □OFF ■ON ☆Blink				A/C status	Possible Reasons
		Dual-8 Code Display	Indicator Display (during blinking, ON 0.5s and OFF 0.5s)								
			Operation Indicator	COOL Indicator	Heating Indicator	D40	D41	D42	D43		
33	Malfunction of module temperature sensor circuit	P7			OFF 3S and blink 18 times	□	□	■	☆	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Replace outdoor control panel AP1
34	Module high temperature protection	P8			OFF 3S and blink 19 times	■	□	☆	■	During cooling operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	After the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If it's no use, please replace control panel AP1.
35	Malfunction of voltage dropping for DC bus-bar	U3			OFF 3S and blink 20 times	□	■	■	■	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	Supply voltage is unstable
36	Voltage of DC bus-bar is too low	PL			OFF 3S and blink 21 times	□	■	■	□	During cooling and drying operation, compressor will stop while indoor fan will operate; During heating operation, the complete unit will stop	1. Measure the voltage of position L and N on wiring board (XT), if the voltage is higher than 150VAC, turn on the unit after the supply voltage is increased to the normal range. 2.If the AC input is normal, measure the voltage of electrolytic capacitor C on control panel (AP1), if it's normal, there's malfunction for the circuit, please replace the control panel (AP1)
37	Limit/decrease frequency due to high temperature of module	EU				■	■	■	☆	All loads operate normally, while operation frequency for compressor is decreased	Discharging after the complete unit is de-energized for 20mins, check whether the thermal grease on IPM Module of outdoor control panel AP1 is sufficient and whether the radiator is inserted tightly. If it's no use, please replace control panel AP1.
38	The four-way valve is abnormal	U7				■	□	☆	□	If this malfunction occurs during heating operation, the complete unit will stop operation.	1.Supply voltage is lower than AC175V; 2.Wiring terminal 4V is loosened or broken; 3.4V is damaged, please replace 4V.
39	Zero- crossing malfunction of outdoor unit	U9				■	■	☆	□	During cooling operation, compressor will stop while indoor fan will operate; during heating, the complete unit will stop operation.	Replace outdoor control panel AP1
40	Limit/decrease frequency due to antifreezing	FH				■	■	■	□	All loads operate normally, while operation frequency for compressor is decreased	Poor air-return in indoor unit or fan speed is too low

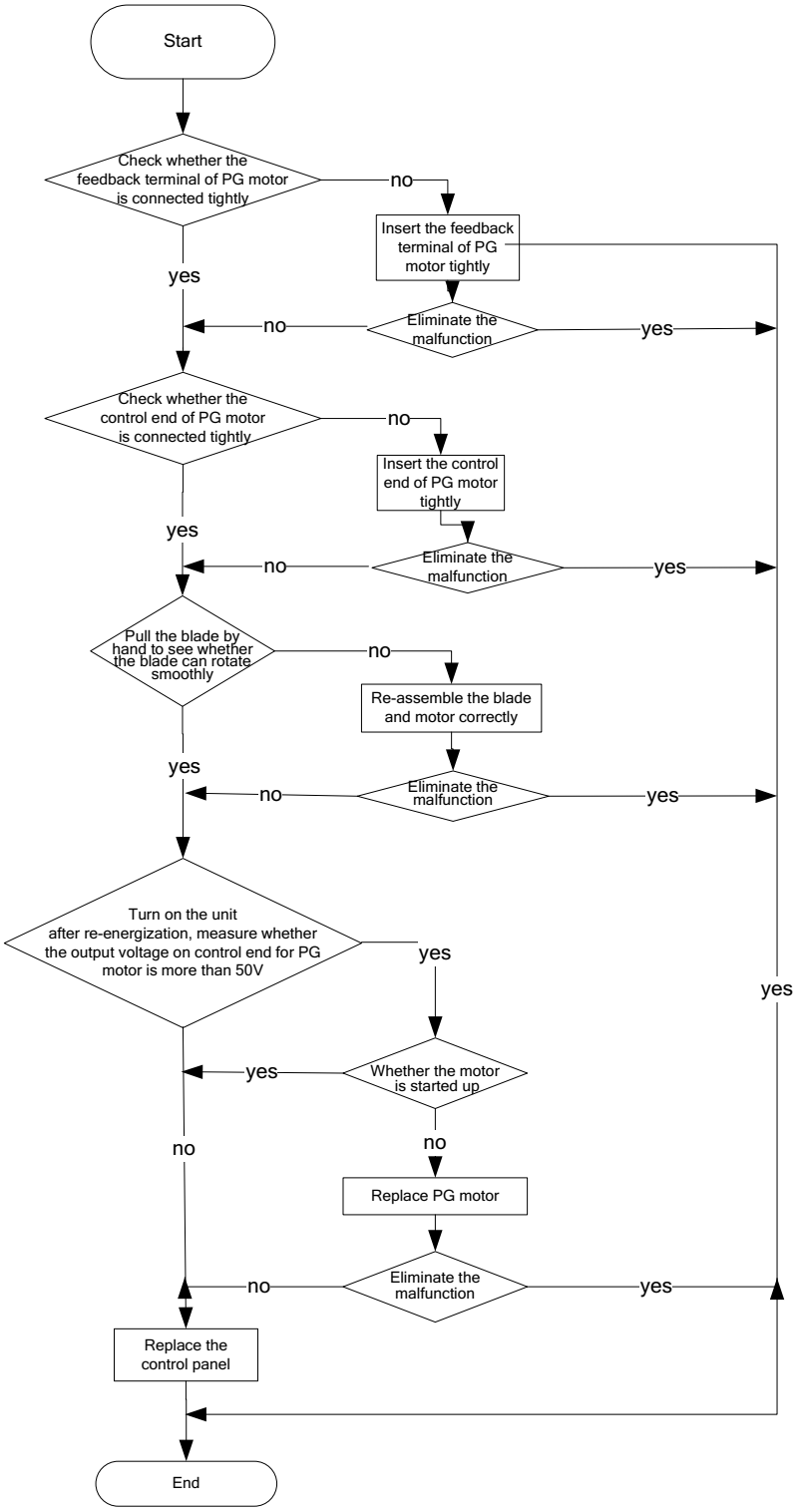
9.4 How to simply check the main part

4.1 Indoor unit:

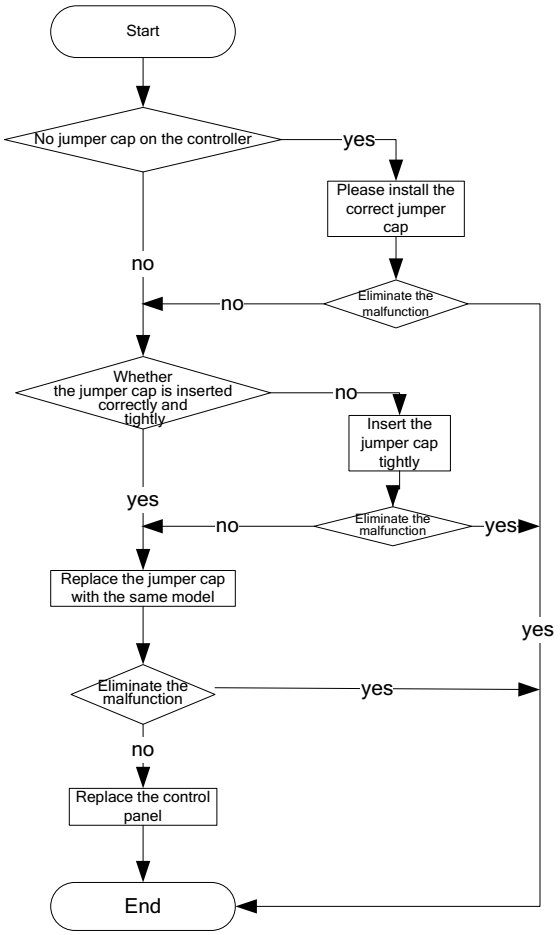
(1) Temperature sensor malfunction



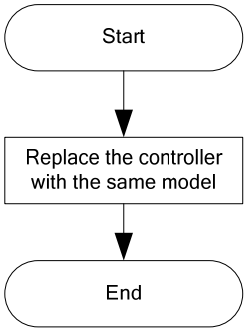
(2) PG motor (indoor fan) does not operate (H6)



(3) Jumper cap malfunction (C5)

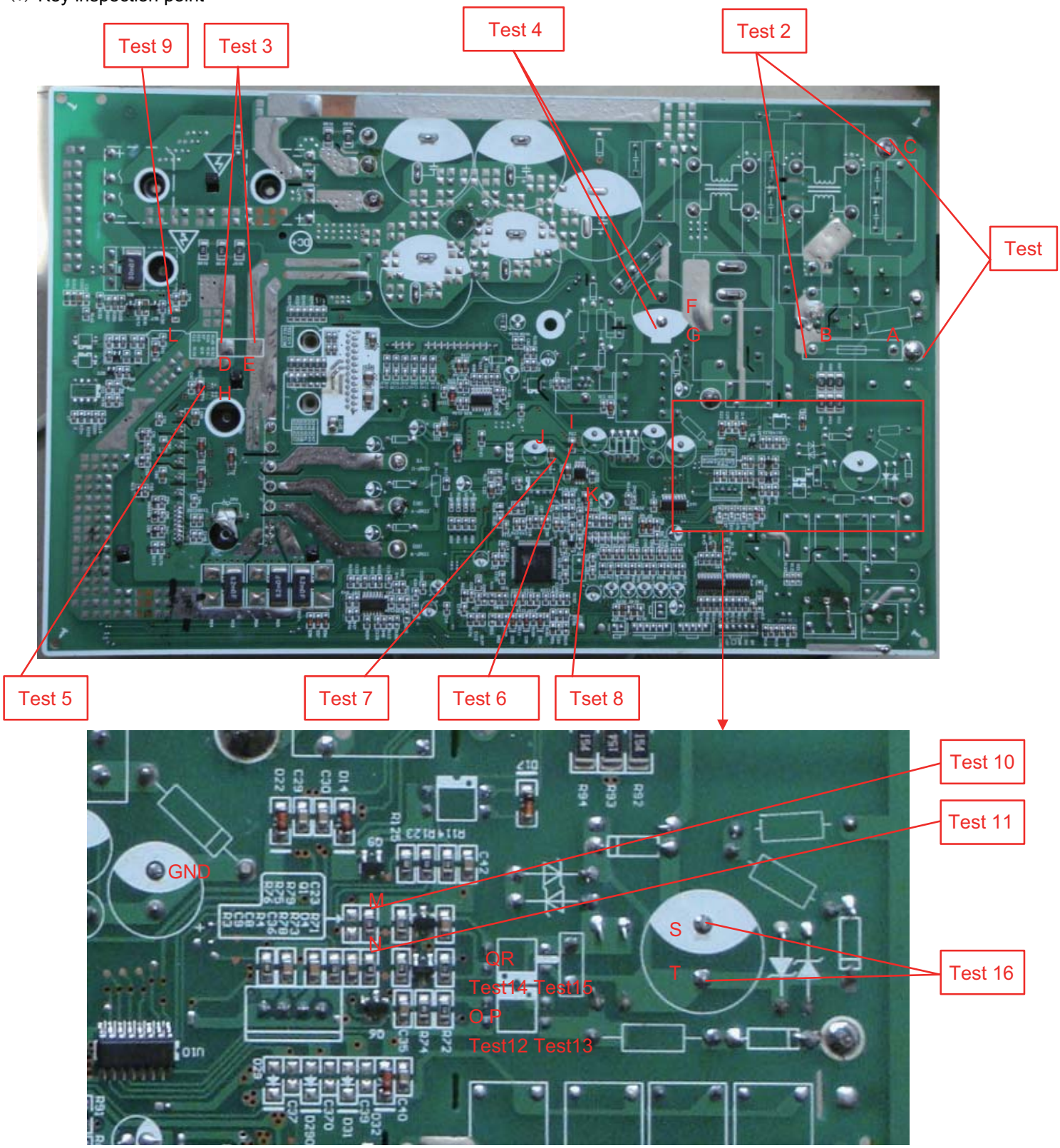


(4) PG motor (indoor fan) circuit malfunction by zero crossing detection (U8)



4.2 Outdoor unit:

（1）Key inspection point



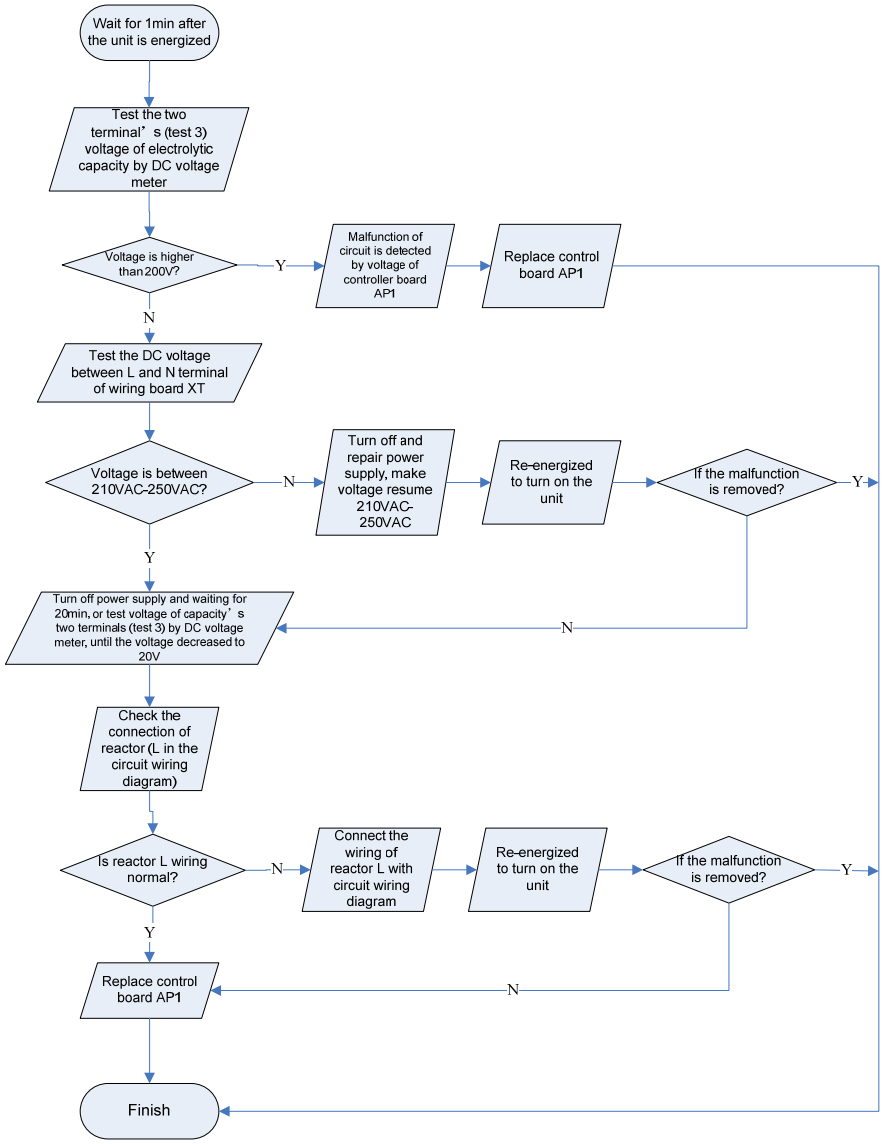
Test point No.	Test point	Corresponding component	Test value under normal situation
Test 1	Between A and C	Neutral wire and live wire	160V-265V
Test 2	Between B and C	Neutral wire and live wire	160V-265V
Test 3	Between D and E	Electrolytic capacity of DC bus bar	180VDC-380VDC
Test 4	Between F and G	Electrolytic capacity of switch power supply	180VDC-380VDC
Test 5	Two terminal of diode D10	D10 (IPM modular+15V power supply)	14.5V-15.6VDC
Test 6	Two terminal of flaky capacity C56	C56 (+12V power supply)	12V-13VDC
Test 7	Two terminal of flaky capacity C58	C58 (+5V power supply)	5VDC
Test 8	Two terminal of flaky capacity C83	C83 (+3.3V power supply)	3.3VDC
Test 9	Two terminal of flaky capacity C80	C80 (+17V power supply)	15-18VDC
Test 10	M forward to GND	M terminal of R75 forward to ground (outdoor signal send TXD)	Jump between 0-3.3V
Test 11	N forward to GND	N terminal of R78 forward to ground (outdoor signal send RXD)	Jump between 0-3.3V
Test 12	O	Receiving terminal of optical coupling (audion side)	Jump between 0.3-1.7V
Test 13	P	Sending terminal of optical coupling (LBD side)	Jump between 0-1.1V
Test 14	Q	Sending terminal of optical coupling (LBD side)	Jump between 0-1.1V
Test 15	R	Receiving terminal of optical coupling (audion side)	Jump between 0-24V
Test 16	Between S-T	Power supply of communication ring	56VDC

(2) Capacity charging malfunction (outdoor unit malfunction) (AP1 below is control board of outdoor unit)

Main detection point:

- Detect if the voltage of L and N terminal of wiring board is between 210AC-240AC by alternating voltage meter;
- Is reactor (L) well connected? Is connection wire loosened or pull-out? Is reactor (L) damaged?

Malfunction diagnosis process:

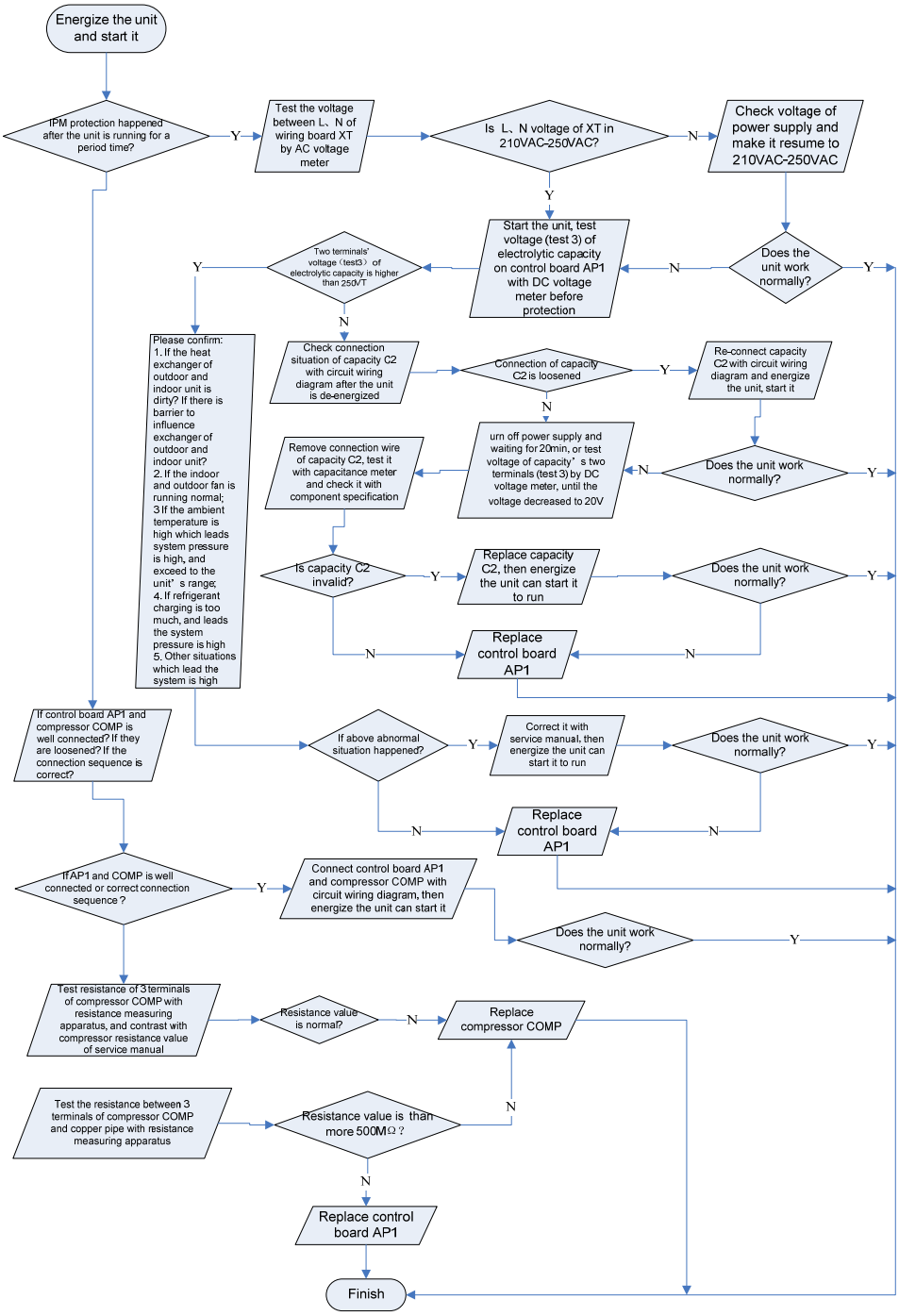

Wait for 1min after the unit is energized
Test the two terminal's (test 3) voltage of electrolytic capacity by DC voltage meter
Voltage is higher than 200V?
Y
Malfunction of circuit is detected by voltage of controller board AP1
Replace control board AP1
N
Test the DC voltage between L and N terminal of wiring board XT
Voltage is between 210VAC-250VAC?
N
Turn off and repair power supply, make voltage resume 210VAC-250VAC
Re-energized to turn on the unit
If the malfunction is removed?
Y
Y
Turn off power supply and waiting for 20min, or test voltage of capacity's two terminals (test 3) by DC voltage meter, until the voltage decreased to 20V
N
Check the connection of reactor (L in the circuit wiring diagram)
Is reactor L wiring normal?
N
Connect the wiring of reactor L with circuit wiring diagram
Re-energized to turn on the unit
If the malfunction is removed?
Y
Y
Replace control board AP1
N
Finish

(3) IPM protection, desynchronizing malfunction, phase current of compressor is overcurrent (AP1 below is control board of outdoor unit)

Main detection point:

- If control board AP1 and compressor COMP is well connected? If they are loosened? If the connection sequence is correct?
- Is voltage input in the normal range (Test the voltage between L、N of wiring board XT by DC voltage meter)?
- If coil resistance of compressor is normal? Is compressor coil insulating to copper pipe well?
- If the work load of unit is heavy? If radiating of unit is well?
- If the refrigerant charging is appropriate?

Malfunction diagnosis process:

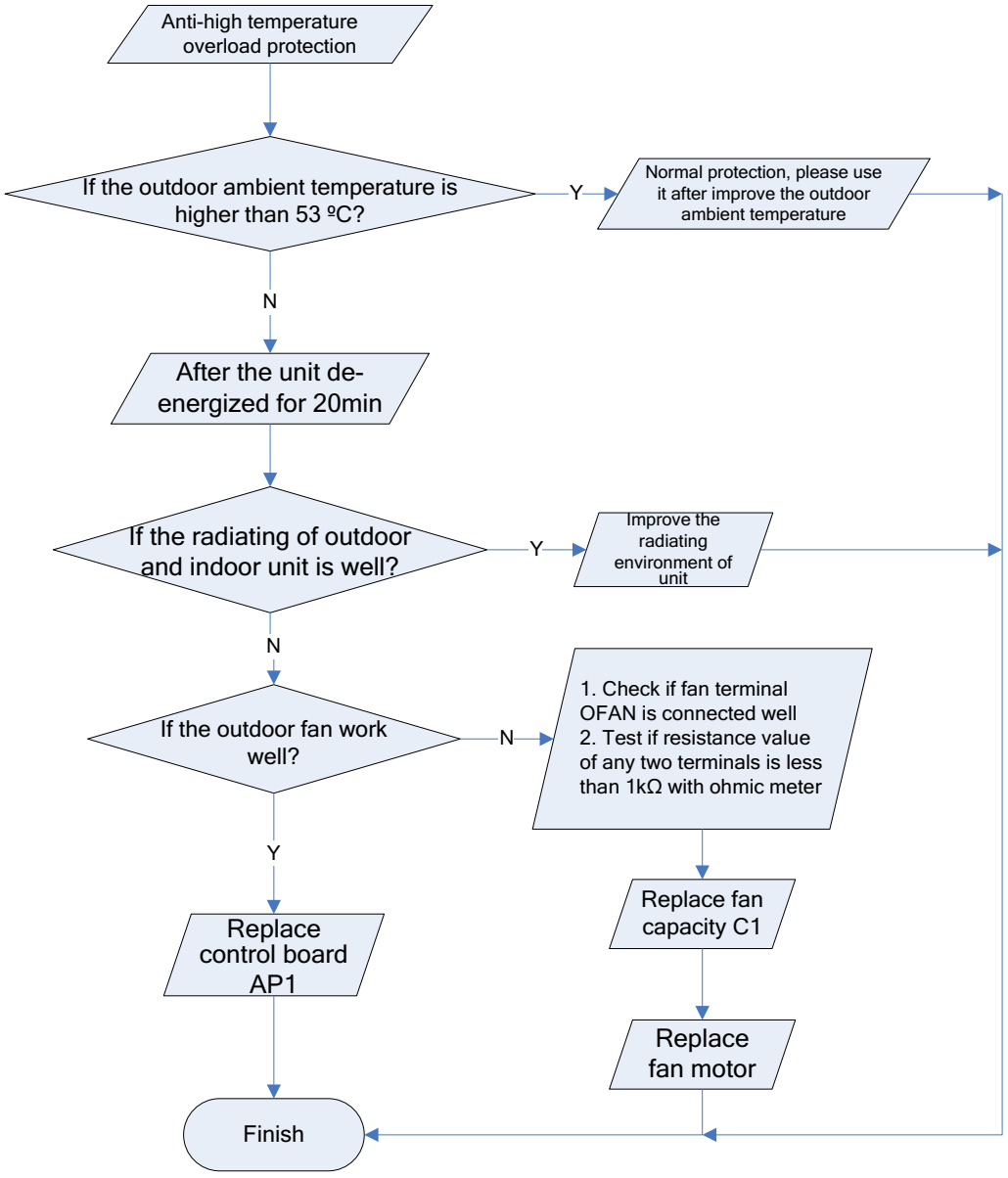

Energize the unit and start it
IPM protection happened after the unit is running for a period time?
Y
Test the voltage between L、N of wiring board XT by AC voltage meter
Is L、N voltage of XT in 210VAC-250VAC?
N
Check voltage of power supply and make it resume to 210VAC-250VAC
Y
Start the unit, test voltage (test 3) of electrolytic capacity on control board AP1 with DC voltage meter before protection
N
Does the unit work normally?
Y
Two terminals' voltage（test3） of electrolytic capacity is higher than 250VT
Y
N
Please confirm:
1. If the heat exchanger of outdoor and indoor unit is dirty? If there is barrier to influence exchanger of outdoor and indoor unit?
2. If the indoor and outdoor fan is running normal;
3 If the ambient temperature is high which leads system pressure is high, and exceed to the unit' s range;
4. If refrigerant charging is too much, and leads the system pressure is high
5. Other situations which lead the system is high
Check connection situation of capacity C2 with circuit wiring diagram after the unit is de-energized
Connection of capacity C2 is loosened
Y
Re-connect capacity C2 with circuit wiring diagram and energize the unit, start it
N
urn off power supply and waiting for 20min, or test voltage of capacity' s two terminals (test 3) by DC voltage meter, until the voltage decreased to 20V
N
Does the unit work normally?
Y
Remove connection wire of capacity C2, test it with capacitance meter and check it with component specification
Is capacity C2 invalid?
Y
Replace capacity C2, then energize the unit can start it to run
Does the unit work normally?
Y
N
Replace control board AP1
N
If control board AP1 and compressor COMP is well connected? If they are loosened? If the connection sequence is correct?
If above abnormal situation happened?
Y
Correct it with service manual, then energize the unit can start it to run
Does the unit work normally?
Y
N
Replace control board AP1
N
If AP1 and COMP is well connected or correct connection sequence ?
Y
Connect control board AP1 and compressor COMP with circuit wiring diagram, then energize the unit can start it
Does the unit work normally?
Y
Test resistance of 3 terminals of compressor COMP with resistance measuring apparatus, and contrast with compressor resistance value of service manual
Resistance value is normal?
N
Replace compressor COMP
Test the resistance between 3 terminals of compressor COMP and copper pipe with resistance measuring apparatus
Resistance value is than more 500MΩ？
N
N
Replace control board AP1
Finish

(4) Diagnosis for anti-high temperature、overload protection (AP1 below is control board of outdoor unit)

Main detection point:

- If the outdoor ambient temperature is in normal range;
- If the indoor and outdoor fan is running normal;
- If the radiating environment of indoor and outdoor unit is well.

Malfunction diagnosis process:

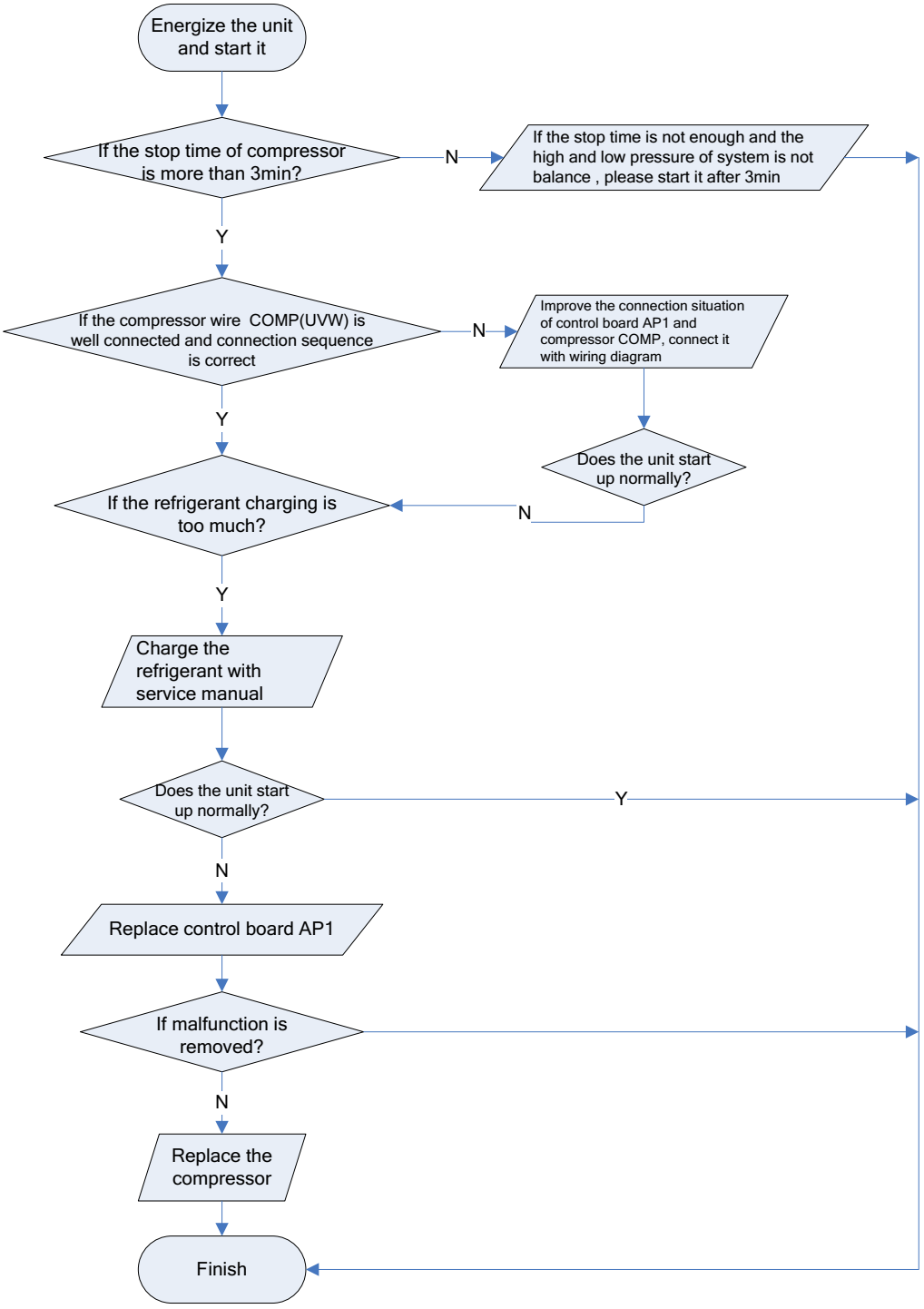

Anti-high temperature overload protection
If the outdoor ambient temperature is higher than 53 ºC?
Y
Normal protection, please use it after improve the outdoor ambient temperature
N
After the unit de-energized for 20min
If the radiating of outdoor and indoor unit is well?
Y
Improve the radiating environment of unit
N
If the outdoor fan work well?
N
1. Check if fan terminal OFAN is connected well
2. Test if resistance value of any two terminals is less than 1kΩ with ohmic meter
Y
Replace control board AP1
Replace fan capacity C1
Replace fan motor
Finish

(5) Diagnosis for failure startup malfunction (AP1 below is control board of outdoor unit)

Main detection point:

- If the compressor wiring is correct?
- If the stop time of compressor is enough?
- If the compressor is damaged?
- If the refrigerant charging is too much?

Malfunction diagnosis process:

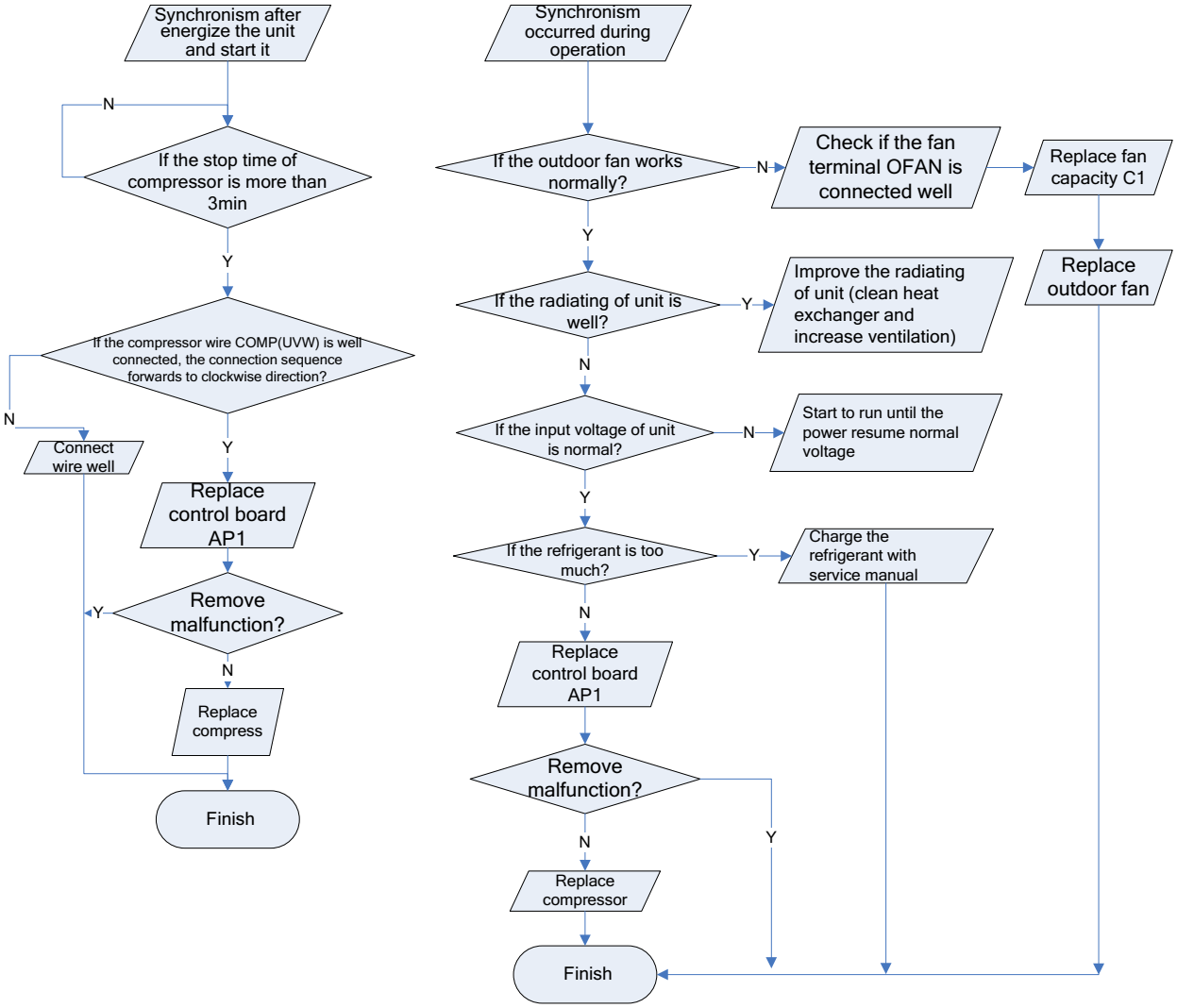

Energize the unit and start it
If the stop time of compressor is more than 3min?
N
If the stop time is not enough and the high and low pressure of system is not balance , please start it after 3min
Y
If the compressor wire COMP(UVW) is well connected and connection sequence is correct
N
Improve the connection situation of control board AP1 and compressor COMP, connect it with wiring diagram
Y
Does the unit start up normally?
If the refrigerant charging is too much?
N
Y
Charge the refrigerant with service manual
Does the unit start up normally?
Y
N
Replace control board AP1
If malfunction is removed?
N
Replace the compressor
Finish

(6) Diagnosis for compressor synchronism (AP1 below is control board of outdoor unit)

Main detection point:

- If the system pressure is over-high?
- If the work voltage is over-low?

Malfunction diagnosis process:

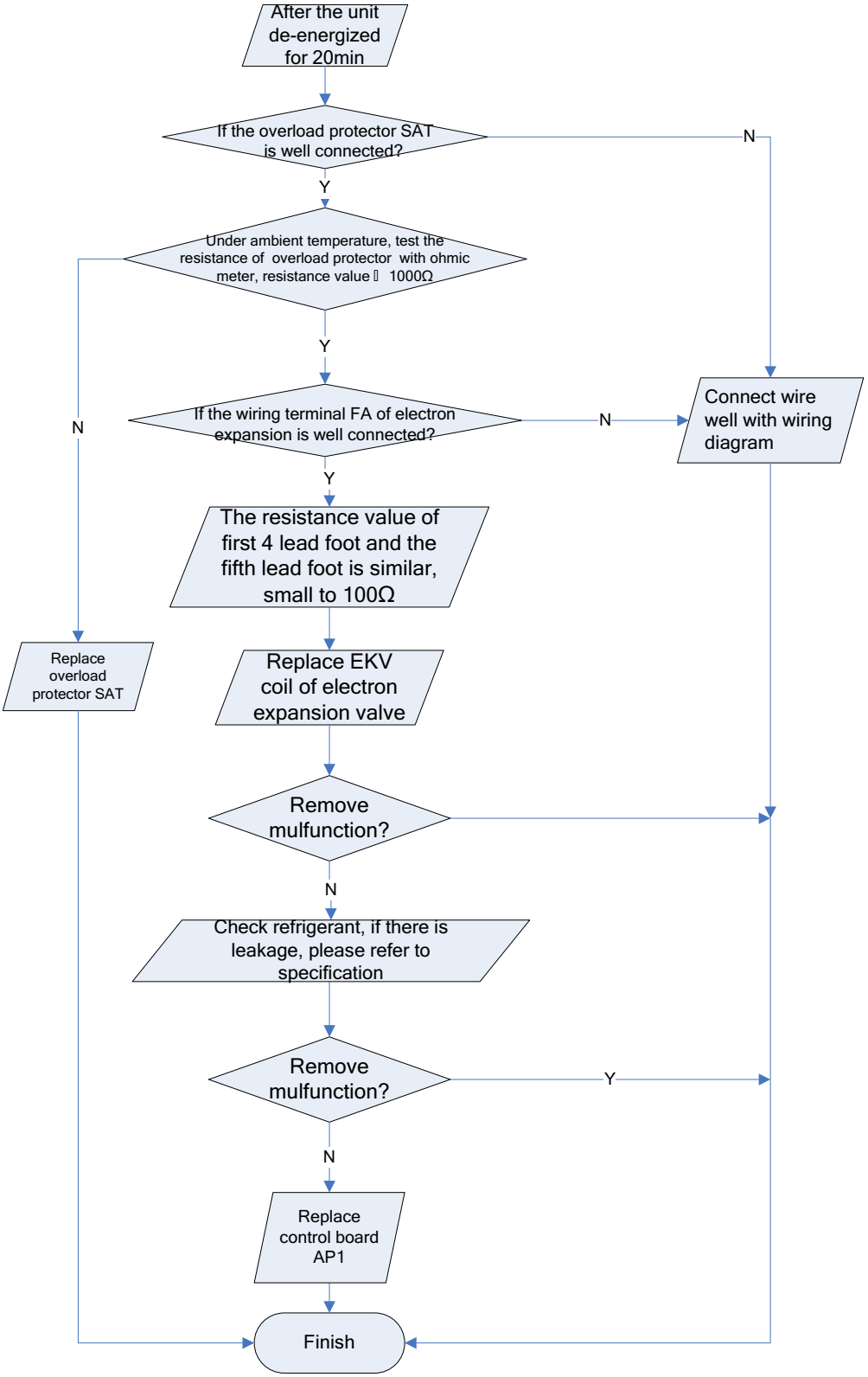


(7) Diagnosis for overload and discharge malfunction (AP1 below is control board of outdoor unit)

Main detection point:

- If the electron expansion valve is connected well? Is the expansion valve damaged?
- If the refrigerant is leakage?
- If the overload protector is damaged?

Malfunction diagnosis process:

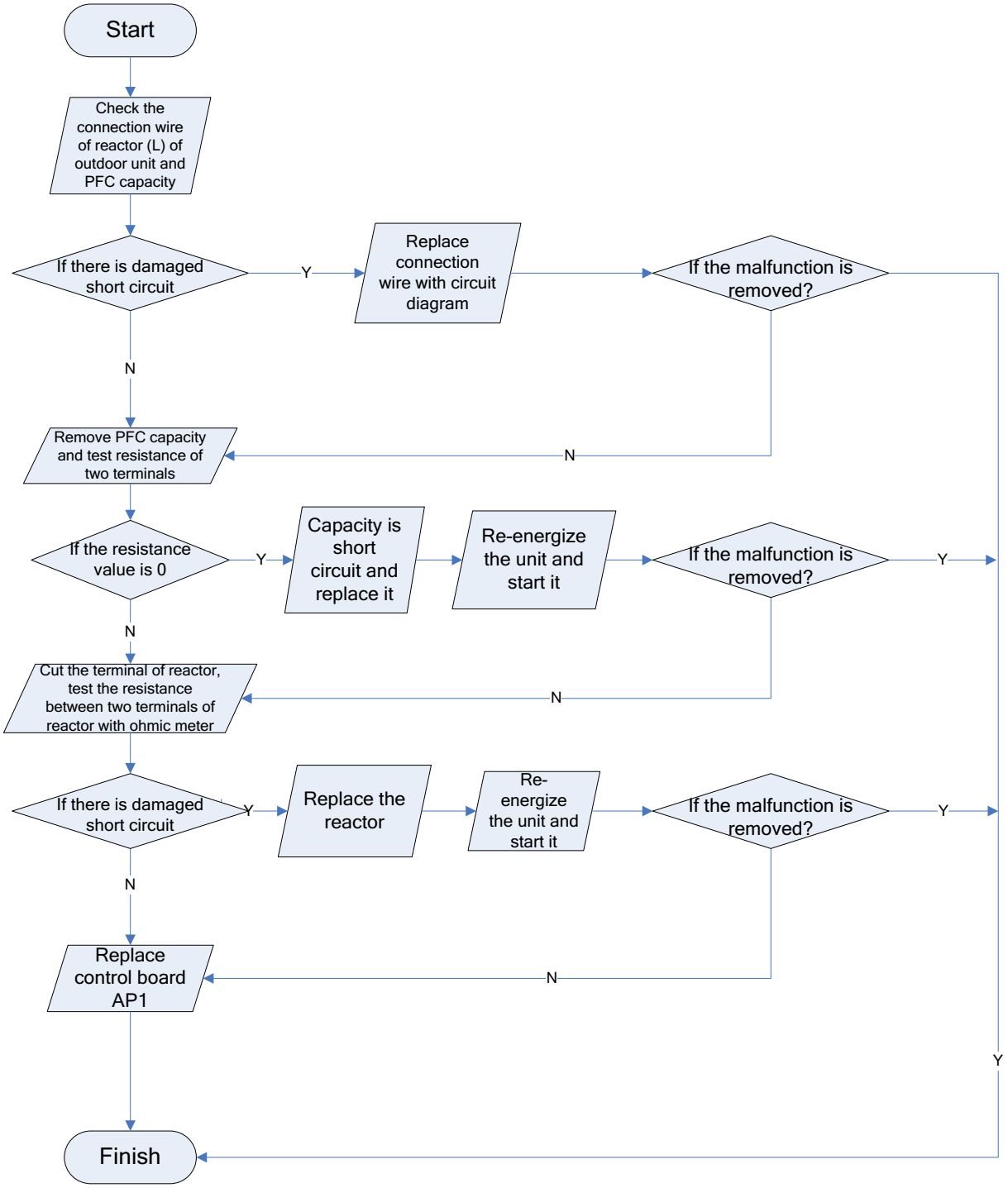

After the unit de-energized for 20min
If the overload protector SAT is well connected?
N
Y
Under ambient temperature, test the resistance of overload protector with ohmic meter, resistance value 1000Ω
Y
N
If the wiring terminal FA of electron expansion is well connected?
N
Connect wire well with wiring diagram
Y
The resistance value of first 4 lead foot and the fifth lead foot is similar, small to 100Ω
Replace overload protector SAT
Replace EKV coil of electron expansion valve
Remove mulfunction?
N
Check refrigerant, if there is leakage, please refer to specification
Remove mulfunction?
Y
N
Replace control board AP1
Finish

(8) PFC (correction for power factor) malfunction (outdoor unit malfunction) (AP1 below is control board of outdoor unit)

Main detection point:

- Check if reactor (L) of outdoor unit and PFC capacity are damaged

Malfunction diagnosis process:

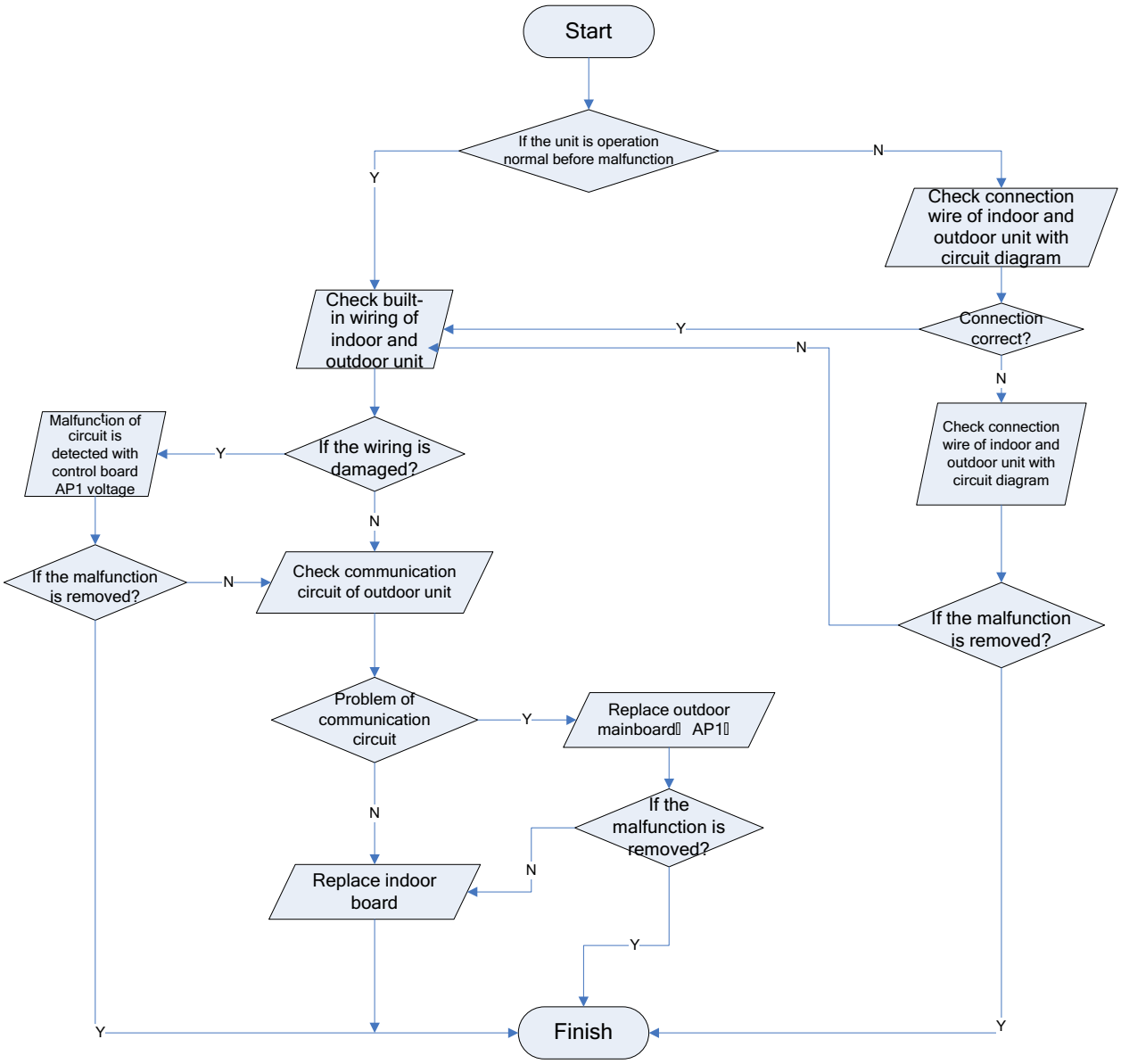

Start
Check the connection wire of reactor (L) of outdoor unit and PFC capacity
If there is damaged short circuit
Y
Replace connection wire with circuit diagram
If the malfunction is removed?
N
Remove PFC capacity and test resistance of two terminals
N
If the resistance value is 0
Y
Capacity is short circuit and replace it
Re-energize the unit and start it
If the malfunction is removed?
Y
N
Cut the terminal of reactor, test the resistance between two terminals of reactor with ohmic meter
N
If there is damaged short circuit
Y
Replace the reactor
Re-energize the unit and start it
If the malfunction is removed?
Y
N
Replace control board AP1
N
Y
Finish

(9) Communication malfunction (AP1 below is control board of outdoor unit)

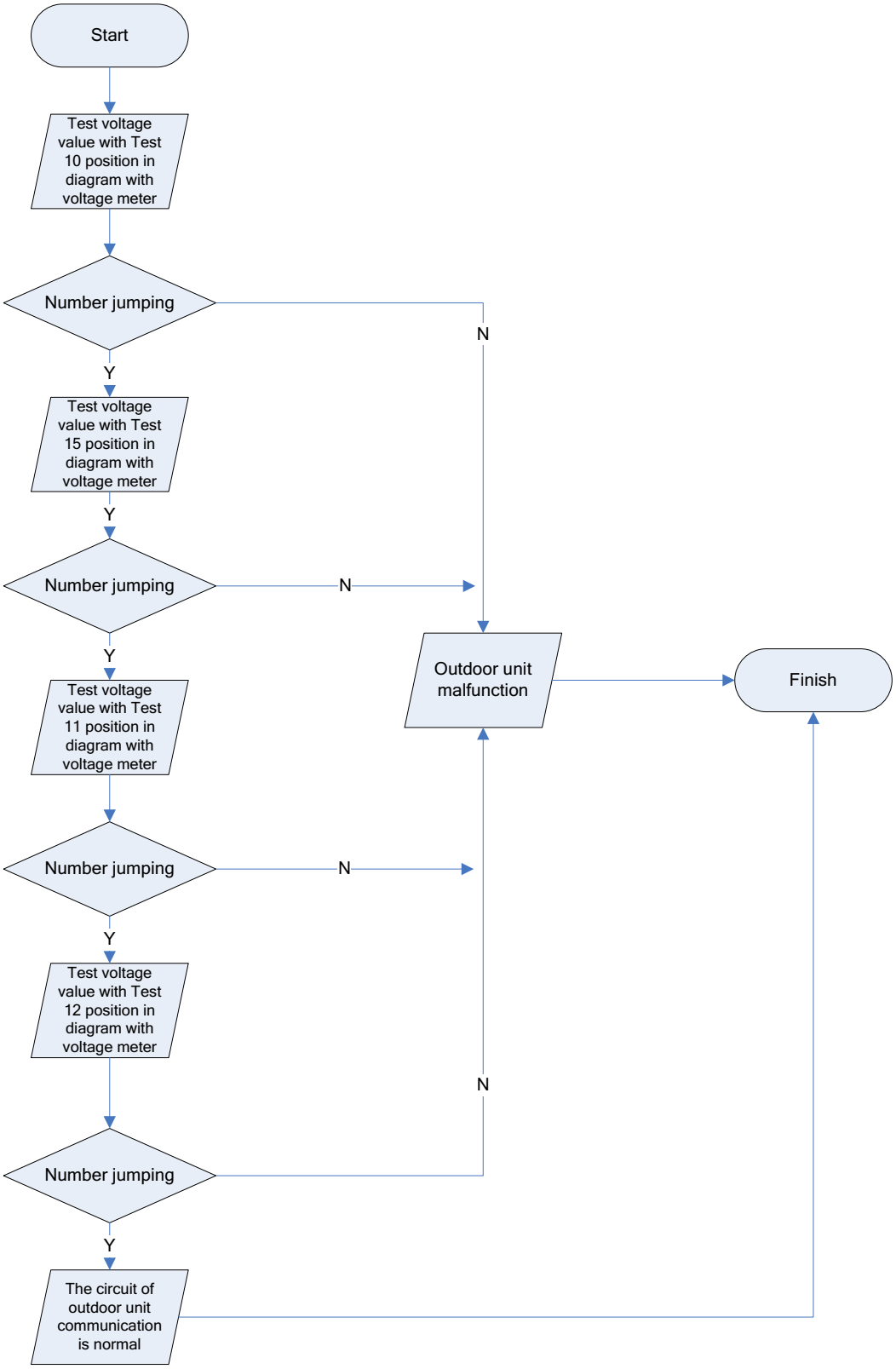
Main detection point:

- Check if the connection wire and the built-in wiring of indoor and outdoor unit is connected well and no damaged;
- If the communication circuit of indoor mainboard is damaged? If the communication circuit of outdoor mainboard (AP1) is damaged?

Malfunction diagnosis process:



(10) Diagnosis process for outdoor communication circuit:



Appendix 1: Resistance Table of Ambient Temperature Sensor for Indoor and Outdoor Units

Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)
-19	138.1	20	18.75	59	3.848	98	1.071
-18	128.6	21	17.93	60	3.711	99	1.039
-17	121.6	22	17.14	61	3.579	100	1.009
-16	115	23	16.39	62	3.454	101	0.98
-15	108.7	24	15.68	63	3.333	102	0.952
-14	102.9	25	15	64	3.217	103	0.925
-13	97.4	26	14.36	65	3.105	104	0.898
-12	92.22	27	13.74	66	2.998	105	0.873
-11	87.35	28	13.16	67	2.896	106	0.848
-10	82.75	29	12.6	68	2.797	107	0.825
-9	78.43	30	12.07	69	2.702	108	0.802
-8	74.35	31	11.57	70	2.611	109	0.779
-7	70.5	32	11.09	71	2.523	110	0.758
-6	66.88	33	10.63	72	2.439	111	0.737
-5	63.46	34	10.2	73	2.358	112	0.717
-4	60.23	35	9.779	74	2.28	113	0.697
-3	57.18	36	9.382	75	2.206	114	0.678
-2	54.31	37	9.003	76	2.133	115	0.66
-1	51.59	38	8.642	77	2.064	116	0.642
0	49.02	39	8.297	78	1.997	117	0.625
1	46.6	40	7.967	79	1.933	118	0.608
2	44.31	41	7.653	80	1.871	119	0.592
3	42.14	42	7.352	81	1.811	120	0.577
4	40.09	43	7.065	82	1.754	121	0.561
5	38.15	44	6.791	83	1.699	122	0.547
6	36.32	45	6.529	84	1.645	123	0.532
7	34.58	46	6.278	85	1.594	124	0.519
8	32.94	47	6.038	86	1.544	125	0.505
9	31.38	48	5.809	87	1.497	126	0.492
10	29.9	49	5.589	88	1.451	127	0.48
11	28.51	50	5.379	89	1.408	128	0.467
12	27.18	51	5.197	90	1.363	129	0.456
13	25.92	52	4.986	91	1.322	130	0.444
14	24.73	53	4.802	92	1.282	131	0.433
15	23.6	54	4.625	93	1.244	132	0.422
16	22.53	55	4.456	94	1.207	133	0.412
17	21.51	56	4.294	95	1.171	134	0.401
18	20.54	57	4.139	96	1.136	135	0.391
19	19.63	58	3.99	97	1.103	136	0.382

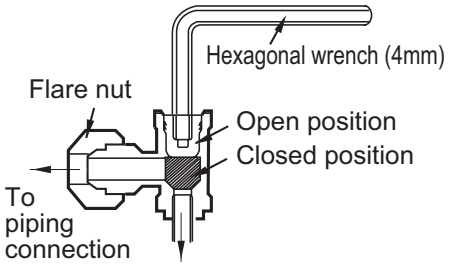
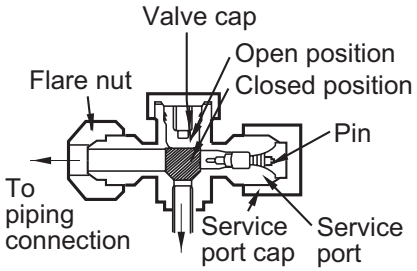
Appendix 2: Resistance Table of Outdoor and Indoor Tube Temperature Sensors

Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)
-19	181.4	20	25.01	59	5.13	98	1.427
-18	171.4	21	23.9	60	4.948	99	1.386
-17	162.1	22	22.85	61	4.773	100	1.346
-16	153.3	23	21.85	62	4.605	101	1.307
-15	145	24	20.9	63	4.443	102	1.269
-14	137.2	25	20	64	4.289	103	1.233
-13	129.9	26	19.14	65	4.14	104	1.198
-12	123	27	18.13	66	3.998	105	1.164
-11	116.5	28	17.55	67	3.861	106	1.131
-10	110.3	29	16.8	68	3.729	107	1.099
-9	104.6	30	16.1	69	3.603	108	1.069
-8	99.13	31	15.43	70	3.481	109	1.039
-7	94	32	14.79	71	3.364	110	1.01
-6	89.17	33	14.18	72	3.252	111	0.983
-5	84.61	34	13.59	73	3.144	112	0.956
-4	80.31	35	13.04	74	3.04	113	0.93
-3	76.24	36	12.51	75	2.94	114	0.904
-2	72.41	37	12	76	2.844	115	0.88
-1	68.79	38	11.52	77	2.752	116	0.856
0	65.37	39	11.06	78	2.663	117	0.833
1	62.13	40	10.62	79	2.577	118	0.811
2	59.08	41	10.2	80	2.495	119	0.77
3	56.19	42	9.803	81	2.415	120	0.769
4	53.46	43	9.42	82	2.339	121	0.746
5	50.87	44	9.054	83	2.265	122	0.729
6	48.42	45	8.705	84	2.194	123	0.71
7	46.11	46	8.37	85	2.125	124	0.692
8	43.92	47	8.051	86	2.059	125	0.674
9	41.84	48	7.745	87	1.996	126	0.658
10	39.87	49	7.453	88	1.934	127	0.64
11	38.01	50	7.173	89	1.875	128	0.623
12	36.24	51	6.905	90	1.818	129	0.607
13	34.57	52	6.648	91	1.736	130	0.592
14	32.98	53	6.403	92	1.71	131	0.577
15	31.47	54	6.167	93	1.658	132	0.563
16	30.04	55	5.942	94	1.609	133	0.549
17	28.68	56	5.726	95	1.561	134	0.535
18	27.39	57	5.519	96	1.515	135	0.521
19	26.17	58	5.32	97	1.47	136	0.509

Appendix 3: Resistance Table of Outdoor Discharge Temperature Sensor

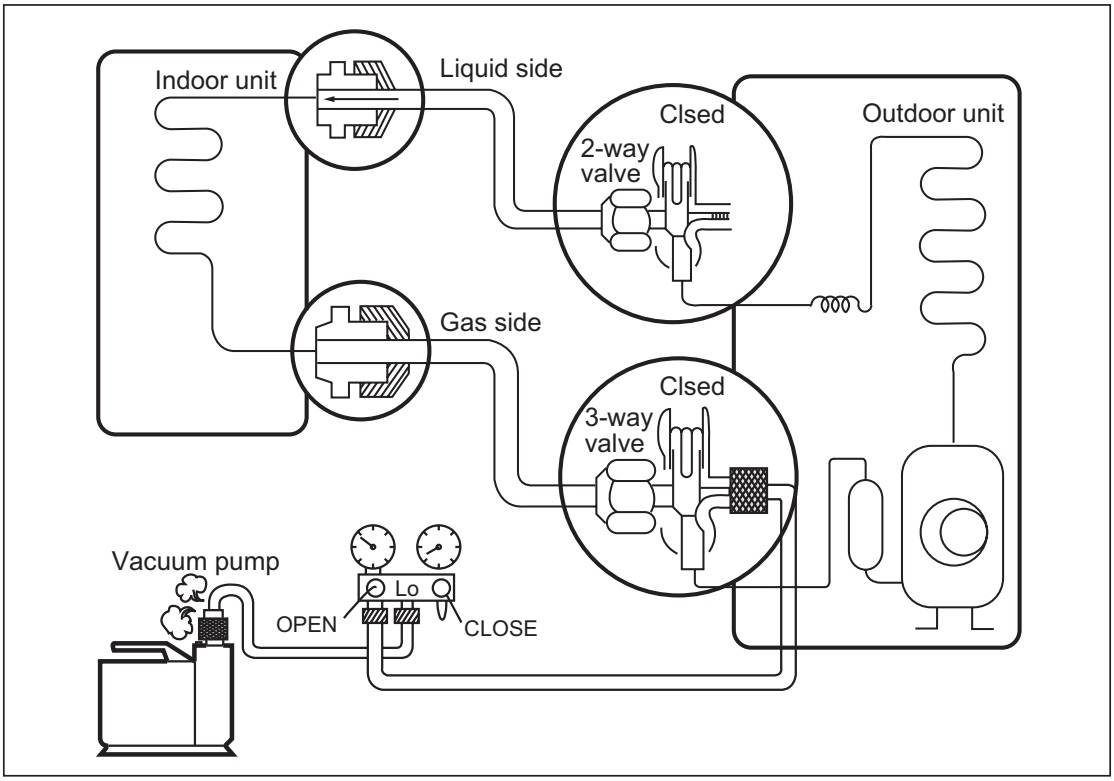
Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)	Temp. (℃)	Resistance (kΩ)
-29	853.5	10	98	49	18.34	88	4.754
-28	799.8	11	93.42	50	17.65	89	4.609
-27	750	12	89.07	51	16.99	90	4.469
-26	703.8	13	84.95	52	16.36	91	4.334
-25	660.8	14	81.05	53	15.75	92	4.204
-24	620.8	15	77.35	54	15.17	93	4.079
-23	580.6	16	73.83	55	14.62	94	3.958
-22	548.9	17	70.5	56	14.09	95	3.841
-21	516.6	18	67.34	57	13.58	96	3.728
-20	486.5	19	64.33	58	13.09	97	3.619
-19	458.3	20	61.48	59	12.62	98	3.514
-18	432	21	58.77	60	12.17	99	3.413
-17	407.4	22	56.19	61	11.74	100	3.315
-16	384.5	23	53.74	62	11.32	101	3.22
-15	362.9	24	51.41	63	10.93	102	3.129
-14	342.8	25	49.19	64	10.54	103	3.04
-13	323.9	26	47.08	65	10.18	104	2.955
-12	306.2	27	45.07	66	9.827	105	2.872
-11	289.6	28	43.16	67	9.489	106	2.792
-10	274	29	41.34	68	9.165	107	2.715
-9	259.3	30	39.61	69	8.854	108	2.64
-8	245.6	31	37.96	70	8.555	109	2.568
-7	232.6	32	36.38	71	8.268	110	2.498
-6	220.5	33	34.88	72	7.991	111	2.431
-5	209	34	33.45	73	7.726	112	2.365
-4	198.3	35	32.09	74	7.47	113	2.302
-3	199.1	36	30.79	75	7.224	114	2.241
-2	178.5	37	29.54	76	6.998	115	2.182
-1	169.5	38	28.36	77	6.761	116	2.124
0	161	39	27.23	78	6.542	117	2.069
1	153	40	26.15	79	6.331	118	2.015
2	145.4	41	25.11	80	6.129	119	1.963
3	138.3	42	24.13	81	5.933	120	1.912
4	131.5	43	23.19	82	5.746	121	1.863
5	125.1	44	22.29	83	5.565	122	1.816
6	119.1	45	21.43	84	5.39	123	1.77
7	113.4	46	20.6	85	5.222	124	1.725
8	108	47	19.81	86	5.06	125	1.682
9	102.8	48	19.06	87	4.904	126	1.64

9.5 2-way, 3-way Valve Appearance

		2-way Valve (Liquid Side)	3-way Valve (Gas Side)	
		 To outdoor unit	 To outdoor unit	
	Works	Shaft position	Shaft position	Service port
	Shipping	Closed (with valve cap)	Closed (with valve cap)	Closed (with cap)
1.	Air purging (Installation)	Closed (clockwise)	Closed (clockwise)	Open (with vacumm pump)
	Operation	Open (with valve cap)	Open (with valve cap)	Closed (with cap)
2.	Pumping down (Transfering)	Closed (clockwise)	Open (counter-clockwise)	Open (connected manifold gauge)
3.	Evacuation (Servicing)	Open	Open	Open (with charging cylinder)
4.	Gas charging (Servicing)	Open	Open	Open (with charging cylinder)
5.	Pressure check (Servicing)	Open	Open	Open (with charging cylinder)
6.	Gas releasing (Servicing)	Open	Open	Open (with charging cylinder)

Air purging

CAUTION: Do not leak the gas in the air during Air purging.



*** Procedure**

(1)Connect the charge hose from the manifold valve to the service port of the gas side packed valve.

(2)Connect the charge hose to the port of the vacuum pump.

(3) Open fully the low pressure side handle of the gauge manifold valve.

(4)Operate the vacuum pump to begin evacuating. Perform evacuating for about 15 minutes if the piping length is 20 meters (15 minutes for 20 meters) (assuming a pump capacity of 27 liters per minute). Confirm that the compound pressure gauge reading is –101 kPa (–76 cmHg).

(5)Close the low pressure valve handle of gauge manifold.

– Check the flare connections for gas leakage.

(6)Use torque wrench to tighten the service port nut to a torque of 1.8kg.cm.

(7)Set the 3-way valve to the back seat.

(8)Mount the valve stem nuts to the 2-way and 3-way valves.

(9)Check for gas leakage.

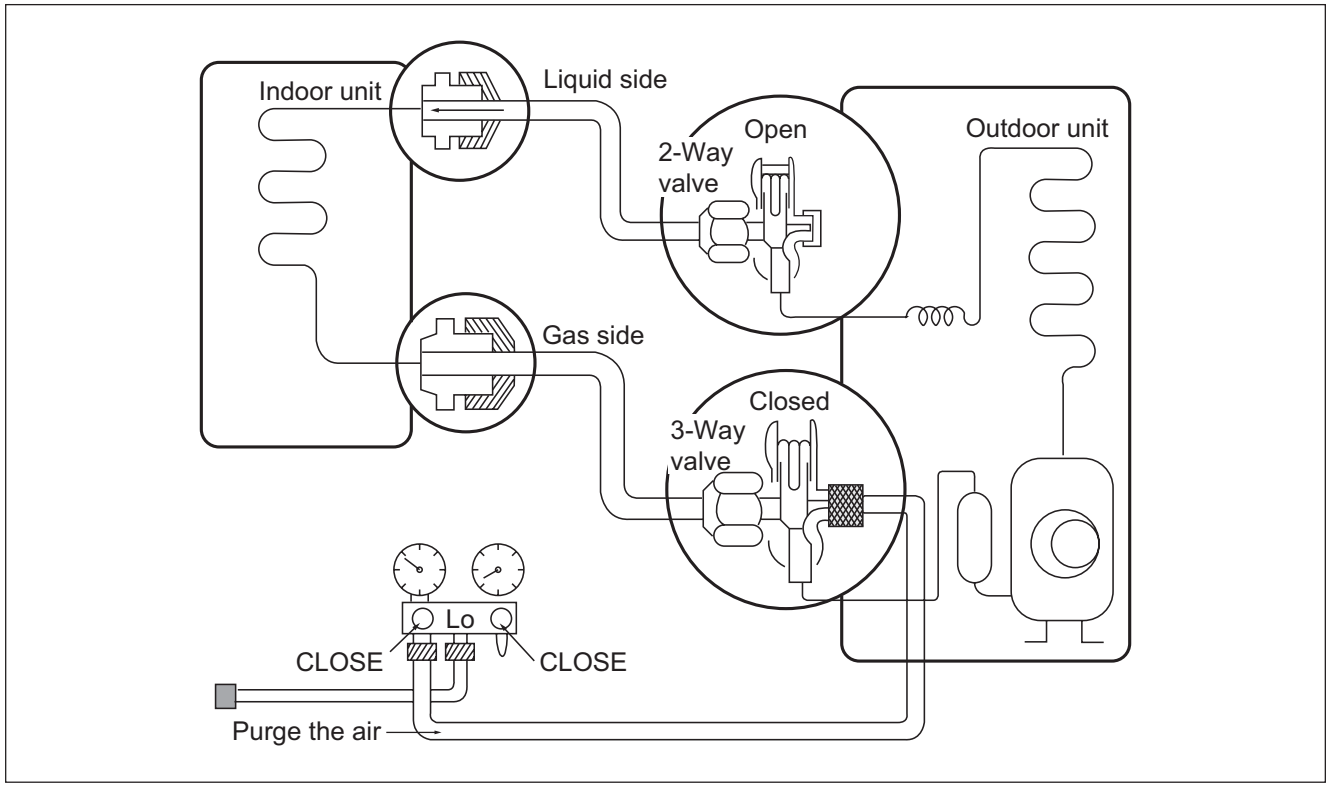
– At this time, especially check for gas leakage from the 2-way and 3-way valve's stem nuts, and from the service port nut.

CAUTION:

If gas leakage are discovered in step 5 above, take the following mesures :

If the gas leaks stop when the piping connections are tightened further, continue working from step 6. If the gas leaks do not stop when the connections are retightened, repair the location of the leak, discharge all of the gas through the service port, and then recharge with the specified amount of gas from a gas cylinder.

Pumping Down



• Procedure

(1) Confirm that both the 2-way and 3-way valves are set to the open position.

– Remove the valve stem caps and confirm that the valve stems are in the raised position.

– Be sure to use a hexagonal wrench to operate the valve stems.

(2) Operate the unit for 10 to 15 minutes.

(3) Stop operation and wait for 3 minutes, then connect the charge set to the service port of the 3-way valve.

– Connect the charge hose with the push pin to the service port.

(4) Air purging of the charge hose.

– Open the low-pressure valve on the charge set slightly to air purge from the charge hose.

(5) Set the 2-way valve to the closed position.

(6) Operate the air conditioner at the cooling cycle and stop it when the gauge indicates 1kg/cm^{2}g.

(7) Immediately set the 3-way valve to the closed position.

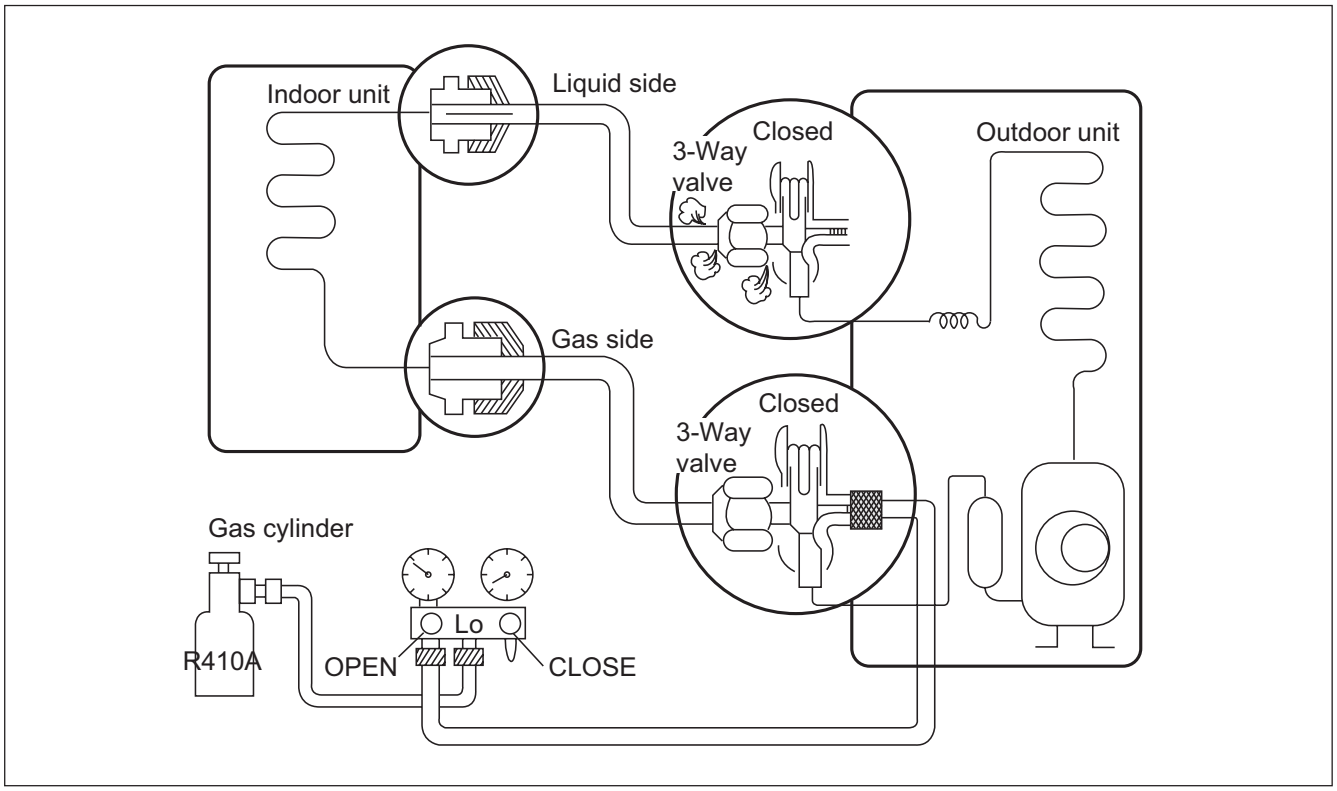
– Do this quickly so that the gauge ends up indicating 3 to 5kg/cm^{2}g.

(8) Disconnect the charge set, and mount the 2-way and 3-way valve's stem nuts and the service port nut.

– Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.

– Be sure to check for gas leakage.

Re-air Purging



• Procedure

(1) Confirm that both the liquid side valve and the gas side valve are set to the closed position.

(2) Connect the charge set and a gas cylinder to the service port of the Gas side valve.

– Leave the valve on the gas cylinder closed.

(3) Air purging.

– Open the valves on the gas cylinder and the charge set. Purge the air by loosening the flare nut on the liquid side valve approximately 45° or 3 seconds then closing it for 1 minute;repeat 3 times.

– After purging the air, use a torque wrench to tighten the flare nut on liquid side valve.

(4) Check for gas leakage.

– Check the flare connections for gas leakage.

(5) Discharge the refrigerant.

– Close the valve on the gas cylinder and discharge the refrigerant until the gauge indicates 3 to 5 kg/cm^{2}g.

(6) Disconnect the charge set and the gas cylinder, and set the Liquid side and Gas side valves to the open position.

– Be sure to use a hexagonal wrench to operate the valve stems.

(8) Mount the valve stem nuts and the service port nut.

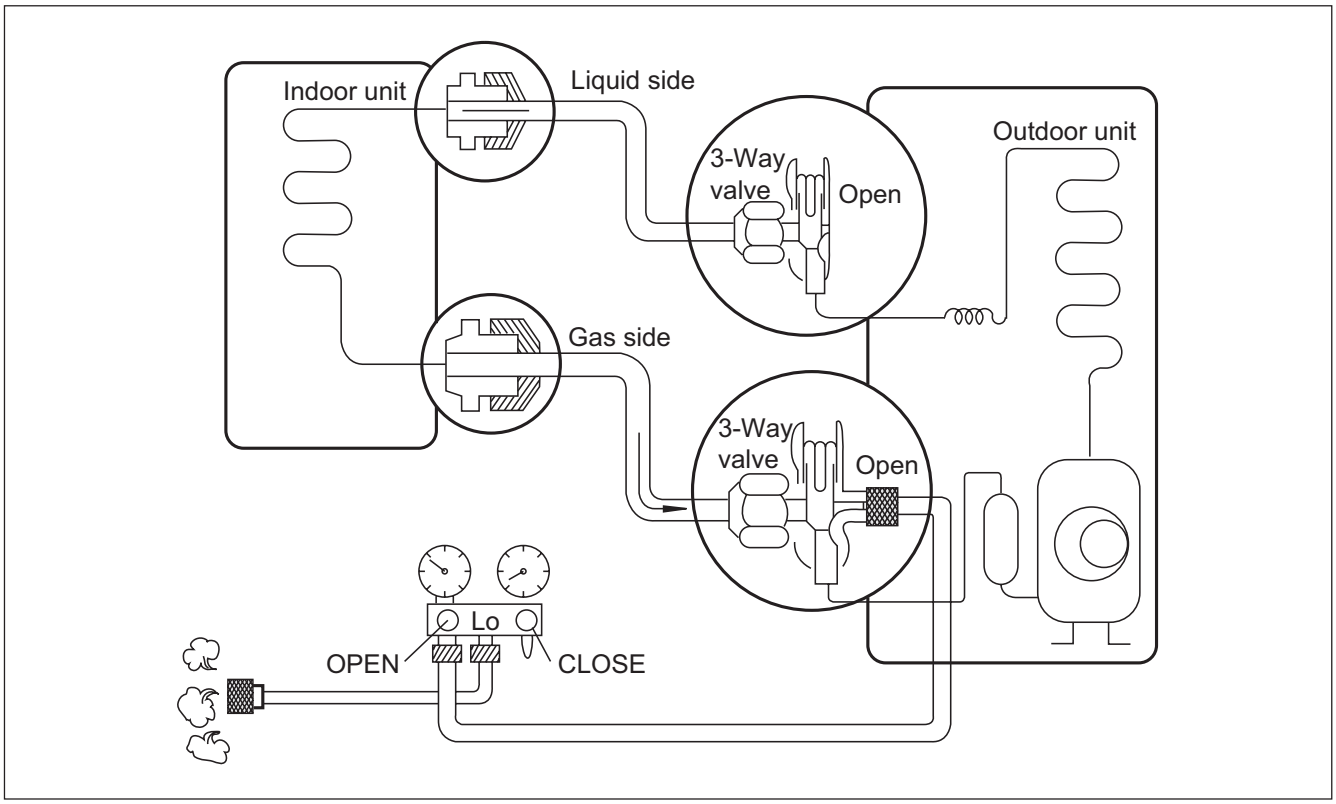
– Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.

– Be sure to check for gas leakage.

CAUTION: Do not leak the gas in the air during Air Purging.

Balance Refrigerant of the 3-way Valve

(Gas leakage)



• Procedure

(1) Confirm that both the 2-way and 3-way valves are set to the back seat.

(2) Connect the charge set to the 3-way valve's port.

– Leave the valve on the charge set closed.

– Connect the charge hose to the service port.

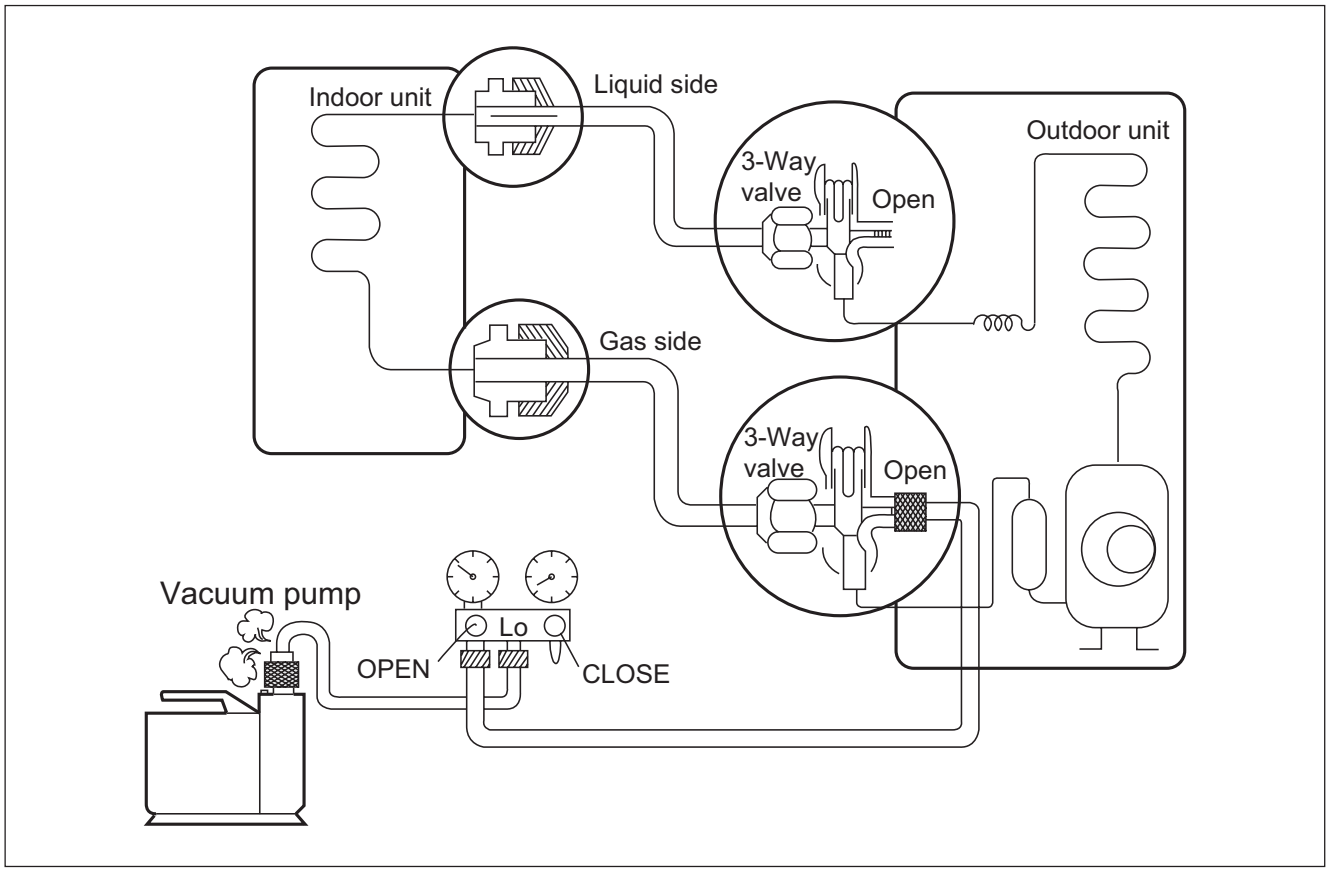
(3) Open the valve (Lo side) on the charge set and discharge the refrigerant until the gauge indicates 0 kg/cm^{2}G.

– If there is no air in the refrigerant cycle (the pressure when the air conditioner is not running is higher than 1kg/cm^{2}G), discharge the refrigerant until the gauge indicates 0.5 to 1kg/cm^{2}G. if this is the case, it will not be necessary to apply a evacuation.

– Discharge the refrigerant gradually; if it is discharged too suddenly, the refrigeration oil will also be discharged.

Evacuation

(All amount of refrigerant leaked)



• Procedure

(1) Connect the vacuum pump to the center hose of charge set center hose

(2) Evacuation for approximately one hour.

– Confirm that the gauge needle has moved toward -76cmHg (vacuum of 4 mmHg or less).

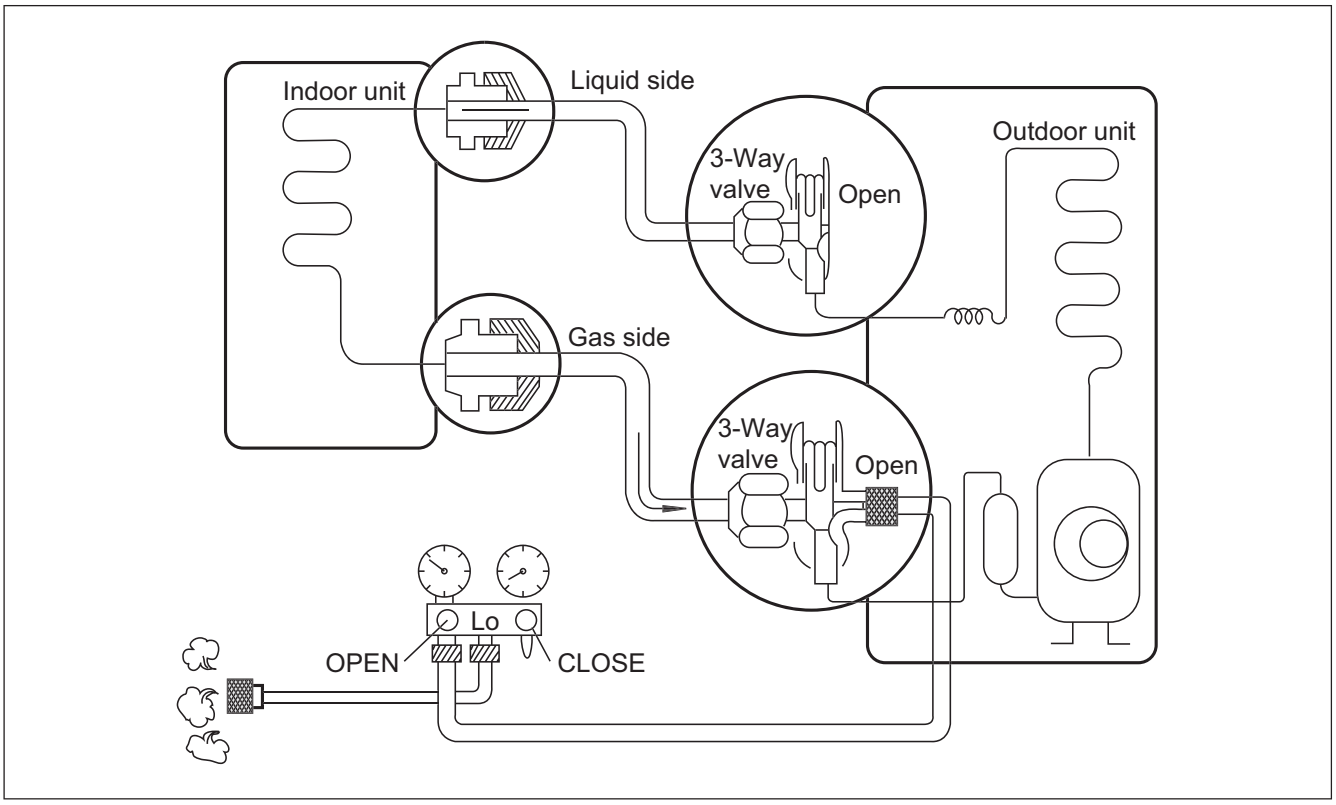
(3) Close the valve (Lo side) on the charge set, turn off the vacuum pump, and confirm that the gauge needle does not move (approximately 5 minutes after turning off the vacuum pump).

(4) Disconnect the charge hose from the vacuum pump.

– Vacuum pump oil.
If the vacuum pump oil becomes dirty or depleted, replenish as needed.

Gas Charging

(After Evacuation)



• Procedure

(1) Connect the charge hose to the charging cylinder.

– Connect the charge hose which you dis-connected from the vacuum pump to the valve at the bottom of the cylinder.

– If you are using a gas cylinder, also use a scale and reverse the cylinder so that the system can be charged with liquid.

(2) Purge the air from the charge hose.

– Open the valve at the bottom of the cylinder and press the check valve on the charge set to purge the air. (Be careful of the liquid refrigerant).

(3) Open the valve (Lo side on the charge set and charge the system with liquid refrigerant.

– If the system can not be charged with the specified amount of refrigerant, it can be charged with a little at a time (approximately 150g each time) while operating the air conditioner in the cooling cycle; however, one time is not sufficient, wait approximately 1 minute and then repeat the procedure (pumping down-pin).

This is different from previous procedures. Because you are charging with liquid refrigerant from the gas side, absolutely do not attempt to charge with larger amounts of liquid refrigerant while operating the air conditioner.

(4) Immediately disconnect the charge hose from the 3-way valve's service port.

– Stopping partway will allow the gas to be discharged.

– If the system has been charged with liquid refrigerant while operating the air conditioner turn off the air conditioner before disconnecting the hose.

(5) Mount the valve stem nuts and the service port nut.

– Use torque wrench to tighten the service port nut to a torque of 1.8 kg.m.

– Be sure to check for gas leakage.